

# The BlueBook

A Medical Guide for our Projects

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Edited by German Doctors e.V.

(Based on the 8<sup>th</sup> edition 2011 by Bettina Ritz and Lisa Sous,  
Peter Krieg and Wolfgang Schafnitzl as co-authors)



German Doctors e.V.

Löbestraße 1a | 53173 Bonn

Phone +49 228 387597-0

Fax +49 228 387597-20

E-Mail [info@german-doctors.de](mailto:info@german-doctors.de)

[www.german-doctors.de](http://www.german-doctors.de)

The BlueBook

## THANKS

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This book could not have been written without the ideas and inspiration of many colleagues and friends. Special thanks are due to our colleague Bettina Ritz, who many years ago, based on her field experience, provided the impetus for the BlueBook in its current form.

For starting the project “BlueBook” with the 1st edition our special thanks go to Gerd Böning, Peter Metzger and Dietmar Schug. The present issue builds mainly on the 7th edition, for which we would like to thank again Bettina Ritz and her co-authors Lisa Sous, Peter Krieg and Wolfgang Schafnitzl. Many other German doctors have contributed to the different editions and without the help of so many dedicated colleagues this revised edition would not be in your hands right now. To all of you, German Doctors, we say: Thank you!

## PREFACE TO THE 9<sup>th</sup> EDITION

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The 8<sup>th</sup> edition of the BlueBook was published nine years ago. The BlueBook had originally been written for the project on Mindanao and was adapted over the years for the rest of our worldwide projects. With the 9<sup>th</sup> edition the entire handbook was thoroughly revised. From the very first edition on numerous doctors on many medical missions, but most of all our patients, have benefited from this special book. More than 3400 doctors have treated patients who are so poor that they could not afford to see a doctor without our help in more than 7500 medical missions since 1983. The BlueBook has repeatedly been praised by these German Doctors in their mission reports and acclaimed for its usefulness in the field.

Projects have developed over the years. Primary Health Care with its training components does make an important difference if we talk about health status in a community. Here again Rolling Clinics in the Philippines are a very successful example. Doctors are asked not only to diagnose and treat but to train, explain, give talks on topics to be part of capacity building in the projects. Therefore, every German Doctor should be prepared to join in when it comes to the above-mentioned activities. In many projects we were able to contribute to strengthening our local partners, not only Clinical Officers and nurses, but also translators, lab and pharmacy personnel and other local colleagues who are eager to move forward. The last years have shown that capacity building is the crucial element to keep our promise to deliver “Help that lasts”.

The new revised edition of the BlueBook should serve as a guideline in respect to the changed working conditions and local contexts in the various projects. It should help guarantee sustainability of the work of German Doctors. If we want to continue our work as a humanitarian aid organization in the long term, we must use our resources as efficiently as possible for the benefit of our patients. One fundamental consideration, a constant background reminder for our daily work, is the rule that costly diagnostic tests, which don't have any therapeutic consequences must be avoided. We sincerely hope that this fundamental principle will always be taken seriously during our work so that we can continue our projects for a long time and to the utmost benefit of our target groups. The new BlueBook provides a good foundation for this purpose.

Bonn, July 2020

Dr. Christine Winkelmann, Dr. Harald Kischlat

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## ALLERGIC RASHES

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### Cause

- Can be caused by exposure to certain allergens e.g. special food, food additives, drugs (e.g. penicillin).
- Other causes: intestinal parasites e.g. helminths, viral infection (e.g. URTI), hepatitis, auto-immune disease

### Symptoms

- Urticaria
- Pruritic maculo-papular rash.
- Fixed drug eruption: Fairly common in our projects with one or several dark brown patches, that become red and itchy, when the causative drug is being taken.

### Diagnosis

- Investigation according to possible underlying cause

### Differential Diagnosis

- Non-allergic rashes e.g. due to
  - Syphilis
  - HIV
  - Viral disease
  - Typhoid fever

### Therapy

- Clean affected areas with cool water.
- Calamine lotion to stop the itch
- Chronic rash:
  - Zinc paste tid or
  - Hydrocortisone 1% ointment tid (only for a short period of time e.g. 10 days)
- Pruritus:
  - Diphenhydramine:
    - » Children: 1-2 mg/kg tid prn
    - » Adults: 50 mg tid prn
- If possible treat underlying cause.
- Advice to avoid exposure to allergens e.g. drugs, certain food etc.

## ANEMIA (INCL. SICKLE CELL ANEMIA)

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### Description

Decreased level of haemoglobin (below the reference levels for age, sex and pregnancy; e.g. males: < 12 g/100 ml; females < 11 g/100 ml), due to impaired production of red cells, loss of red cells due to bleeding or increased destruction (haemolysis).



### Concerned persons

#### Iron deficiency anemia:

Children (both infants and schoolchildren) and pregnant women are most often affected by bleeding and iron deficiency anemia. Women of childbearing age also suffer relatively frequently from anemia in the project areas. In children, chronic bleeding anemia is often caused by recurrent worm diseases and an iron-deficient diet. In women, regular menstrual blood loss is added, which cannot be compensated sufficiently due to iron deficiency. Men suffer less often from anemia.

#### Sickle cell anemia:

occurs in genetic affected people most common in black African people

#### Thalassemia:

in major form is seen in genetic affected children with early death due to the multiple complications. The minor form is to be seen in adults with only mild symptoms.

#### Glucose-6-phosphate dehydrogenase deficiency:

Is seen in genetic affected people in Africa, Asia and Eastern Europe when having additional infections or contact with special food and drugs. But it also is conferring about 50% protection against severe malaria.



### Epidemiology

According to the WHO, 1.62 billion people worldwide are affected by anemia. In the various age groups, 47.4% of all pre-school children, 25.4% of all school children, 41.8% of all pregnant women, 30.2% of all women of childbearing age, 12.7% of all men and 23.7% of all older people are affected. Anemia is most common in Africa, followed by Southeast Asia, the Eastern Mediterranean region, the Americas, the Western Pacific region and Europe.

Sickle cell anemia is most common in Africa, but also in India, Central America, the Caribbean and the Arabian Peninsula. In some regions of Africa, up to 40% of the population carry the genetic modification for sickle cell anemia. Around 9% suffer from manifest sickle cell anemia because they are homozygous carriers. Thalassemia is to be seen mainly in the Mediterranean and South East Asia.

## Cause

Major causes: malnutrition (iron and/or folate deficiency, mainly in children or women of childbearing age), infections (e.g. malaria, helminth infections, tuberculosis or HIV/AIDS), bleeding (e.g. ulcer)

Rarer causes:

- Sickle cell disease (haemolytic anemia due to production of abnormal haemoglobin)
- Thalassemia (reduced production of globin chains leading to ineffective erythropoiesis and haemolysis)
- Glucose-6-phosphate dehydrogenase deficiency (Enzyme defect conferring susceptibility to developing haemolytic anemia with certain food (e.g. fava beans), drugs (e.g. primaquine or sulfo-namides) or severe infections)
- Leishmaniasis and others

## Symptoms

Iron deficiency anemia

- concentration problems
  - fatigue
  - headaches
  - shortness of breath
  - infirmity
  - palpitations
  - Pica Syndrome (Occasional)

Sickle cell anemia

- Normocytic anemia with reticulocytosis, sickle cells and target cells in blood film
  - Jaundice
  - often: painful swelling of hands and feet
  - Splenomegaly in children
  - later: renal failure, bone necrosis, infections
  - Sickle cell crisis:
    - thrombotic crisis brought on by infection, dehydration etc.
    - severe pain, often in the bones
    - DD: acute abdomen, pneumonia

Thalassemia

- Major form:

- Starting in infancy
- Hypochromic microcytic anemia with target cells
- Children: failure to thrive
- Recurrent infections, splenomegaly
- Early death due to severe anemia
- Minor form:
  - Usually asymptomatic
  - Mild anemia, worse during pregnancy

#### Glucose-6-phosphatase deficiency

- Symptoms depending on the severity of enzyme deficiency
  - Symptoms developing rapidly:
    - Haemolytic anemia
    - Jaundice
    - Dark urine (haemoglobinuria)
    - Pallor
  - Neonatal jaundice more severe with G6PD deficiency



#### Diagnosis

Regarding diagnostic procedures: always think of cost-effectiveness and therapeutic consequences! They should only be performed if previous treatment has been unsuccessful (e.g. for hookworms).

- Look for diagnostic signs e.g. splenomegaly, hepatomegaly (malaria, kala-azar, schistosomiasis, sickle cell anemia, thalassemia), fever (malaria), haemoptysis (tuberculosis), haematemesis (peptic ulcer disease), blood in faeces.
  - Laboratory investigations:
    - » Haemoglobin, haematocrit
    - » Blood film to check red cell morphology, target cells etc.
  - Questions to ask to interpret blood results:
    - Is the anemia hypochromic (e.g. iron deficiency anaemia) or normochromic (check MCHC)?
    - If hypochromic: are there target cells (thalassemia)?
    - If normochromic: is the anemia normocytic or macrocytic (check MCV)?
    - If normocytic: could it be due to blood loss or haemolysis (consider thick film for malaria)?
    - If macrocytic: is the anemia megaloblastic (folate or vitamin B12 deficiency)?



## Differential Diagnosis

Normochrome, normocytic anemia:

- Malaria (with fever and splenomegaly)
  - Kala Azar (with splenomegaly)
  - Schistosomiasis (possibly blood in urine)
  - Tuberculosis
  - Chronic Infections
  - Sickle cell anemia
  - Gastric/duodenal ulcers
  - Renal anemia

Macrocytic, hyperchromic anemia:

- Vitamin B12 deficiency
  - folic acid deficiency
  - liver diseases



## Therapy

Iron deficiency

Treatment (WHO and INACG guidelines) recommendation

- Elementary iron:
  - Children: 5 mg/kg OD
  - Adults: 120 mg OD
  - Duration of treatment: 3 months
  - Inform patients about possible side effects e.g. dark stools, stomach upsets, constipation etc.

Prophylaxis:

- Pregnant women:
  - Elementary iron: 60 mg od plus folic acid 0.8 mcg OD until delivery
- Malnourished children:
  - Elementary iron: 2 mg/kg/day plus folic acid 5 mg OD; later:
  - Elementary iron: 2 mg/day
  - Severely malnourished children: iron supplement should not be given during the first days of treatment

Note:

Dosage has to be adjusted to available preparations e.g. ferrous sulphate : elementary iron 3:1.

## Thalassemia

- Folic acid only:
  - Children < 1 year: 0.5 mg/kg OD
  - Children > 1 year, adults: 5 mg OD
  - Duration of treatment: up to 4 months
  - Avoid treatment with iron (danger of haemosiderosis)
  - Major form: problem with transfusion - > life-long treatment, therefore not possible in our projects

## Sickle cell anemia

- Folic acid:
  - Children < 1 year: 0.5 mg/kg OD
  - Children > 1 year, adults: 5 mg/day
  - Duration of treatment: up to 4 months
- Transfusion:
  - Only if absolutely necessary (with signs of decompensation e.g. cardiac failure)
    - » Packed red blood cells or blood from relatives if at all possible
- Sickle cell crisis:
  - Analgesics e.g. paracetamol or tramadol
- Anemia and infection prophylaxis:
  - Penicillin prophylaxis (125 mg 2x/d up to 3 years of age, then 250 mg 2x/d up to 5 years of age)
  - Pneumococcus vaccination (partial vaccination in the 2nd, 4th, 6th and 12th month of life, then at the age of 2 and 5 years)
  - Folic acid (1 mg/d)

## Glucose-6-phosphate dehydrogenase deficiency

- Therapy of haemolysis
- No causative treatment available



## Prevention

### Iron deficiency anemia

There are 2 categories of iron in the diet:

- Heme iron: in meat, poultry, fish; easily absorbed
- Nonheme iron: in vegetables e.g. legumes, pumpkin, beans, peas; also in cereals, wheat, barley, oat etc.; not easily absorbed (absorption of iron is enhanced by ascorbic acid and inhibited by tannates in tea and coffee)
- Highest prevalence: children of the age of 6 months to 3 years and women of child-

bearing age due to menstruation or pregnancy

 Antihelmintic treatment:

- Albendazole:
  - Children < 2 years: 200 mg single dose
  - Children > 2 years, adults: 400 mg single dose (avoid in the first trimester of pregnancy)
- Mebendazole:
  - Children > 2 years, adults: 100 mg bid for 3 days (avoid in the first trimester of pregnancy)
  - Blood transfusion: must be restricted to severe anaemia (danger of transmitting diseases such as hepatitis B or C, HIV, malaria, syphilis etc.); use relatives as blood donors if at all possible.
- Nutritional advice: eat foods rich in iron such as meat, fish, chicken, liver; also dark leafed vegetables like peas, lentils, with fruit rich in ascorbic acid such as papaya, mango, pineapple, sweet potato
  - Avoid drinking tea and coffee or dairy products with main meals
  - Advice regarding cleanliness
  - Advice regarding spacing of children

Glucose-6-phosphate dehydrogenase deficiency

- Withdrawal of offending drugs (e.g. primaquine or sulfo-namides)
- Avoid causative food (e.g. fava beans),
- Prevent severe infections

Note: Always remember to do a screening test for glucose-6-phosphate dehydrogenase deficiency before starting a patient on primaquine!

## BURNS

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### Symptoms

- 1st degree burn: redness
- 2nd degree: blistering of skin
- 3rd degree: deep burn: black charred skin, diminished sensitivity
- Secondary infection possible
- Pain and fluid loss can lead to shock

### Diagnosis

- Time of accident
- What happened?
- Depth of burn
- Extent of burned areas (rough estimate):
  - Children:
    - » Entire head: 18%
    - » Arm: 9%
    - » Leg: 14%
    - » Front of chest and abdomen: 15%
    - » Back of chest and abdomen: 15%
    - » Buttocks: 3% each
  - Adults:
    - » Head: 9%
    - » Front of trunk: 18%
    - » Back of trunk: 18%
    - » Arm: 9%
    - » Hands 1%
    - » Leg: 18%

### Therapy

Burned area must be dipped in cool water or cooled down with cold compresses immediately to prevent major damage!

- 1st degree burn:
  - Painkillers e.g. paracetamol PO:
    - » Children: 30 mg/kg in 3-4 divided doses
    - » Adults: 500-1000 mg up to qid
  - For severe pain: tramadol PO, IV, IO, IM if available:
    - » Children 1-11 years: 1-2 mg/kg up to tid prn

- » Children >11 years, adults: 2 mg/kg tid prn
- 2nd degree burn:
  - Avoid bursting the blisters.
  - Open blisters: gently clean burned area.
  - Silver sulphadiazine (flamazine) to affected areas to prevent infection
    - » Caution: avoid silver sulphadiazine in pregnancy (esp. in the last trimester), in breast-feeding women and in neonates (risk of neonatal haemolysis and methaemoglobinaemia; also question of increased risk of kernikterus). Use in pregnancy only if benefits are greater than risk to foetus.
    - » Avoid using silver sulphadiazine for large areas (increased risk of side effects of sulphonamides e.g. leucopenia or rash).
  - Apply clean dressing to burns. Dress each finger or toe separately.
- Alternatively:
  - Clean burns.
  - Dressing with sofratull and povidone iodine solution/ointment
  - Infected burns: broad-spectrum antibiotics e.g. amoxicillin
  - Painkillers e.g.:
    - » Children:
      - » Paracetamol 30 mg/kg PO in 3-4 divided doses or
      - » Tramadol 1-2 mg/kg PO, IV, IO, IM tid if available or
      - » Metamizole ½ drop/kg (= 10 mg/kg) PO in 3 divided doses
    - » Adults:
      - » Paracetamol 500-1000 mg PO qid or
      - » Tramadol 2 mg/kg PO, IV, IO, IM up to tid or
      - » Metamizole 18-36 drops PO up to qid
    - » Rehydration:
      - » Increase fluid intake:
        - » Normal fluid requirement (see moderate dehydration plan B, p.91)
        - » Add 20 mL/kg for every 10% of body surface or part of it
        - » Give ORS (oral rehydration solution), in severe burns IV-infusion e.g. with Ringer's Lactate solution.
    - » Give tetanus prophylaxis.
- Refer to hospital:
  - Severe burn (> 25% body surface)
  - 3rd degree burn
  - Burn of face and eyelids
  - Patients with contractures

Note: For change of dressing it might be necessary to give ketamine

## COUGH

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### Description

- Physiological method of clearing the airways
- Often associated with dyspnoea



### Symptoms

#### Questions to ask:

- Cough productive (with phlegm) or dry?
- Colour of sputum (purulent, haemoptysis)?
- Duration of symptoms (acute or chronic (>3 weeks))?
- Onset (sudden onset, progressive)?
- Exposure to air pollutants (e.g. smoke of fire)?
- Smoker?
- Any pre-existing disease?
- Concurrent medication ( $\beta$ -blockers, ACE-inhibitors)?
- Association with other symptoms and signs (weight loss, runny nose, fever, loss of appetite, dyspnoea, psychological signs)?



### Diagnosis

#### Clinical examination:

- Nutritional status (weight, anemia)
- Temperature
- Cardiovascular system (heart, lung, blood pressure)
- Gastrointestinal system (abdomen, spleen, liver)
- Lymph nodes
- Mucus membranes (?cyanosis)

#### Investigations as necessary:

- FBC
- AFB
- Peak flow
- CXR
- SPO<sub>2</sub>



### Differential Diagnosis

- Acute cough:
  - Diseases of the airways:

- » URTI, tracheobronchitis (?viral infection)
- » Sinusitis (postnasal drip)
- » Whooping cough (bouts of cough associated with vomiting)
- » Croup (inspiratory stridor)
- » Aspiration (sudden onset, often distress)
- » Exposure to air pollutants (history)
- » Bronchial asthma (recurrent episodes, nocturnal attacks)
- » Parasitic disease (loss of appetite, history of worms)
- Diseases of the lungs:
  - » Pneumonia (fever, tachypnea, dyspnoea, productive sputum)
  - » Pleuritis (pleuritic pain, when breathing)
  - » Pulmonary embolism (sudden onset, period of immobility, pregnancy)
  - » Pneumothorax (sudden onset, accident)
- Heart diseases:
  - » Acute left ventricular failure (cardiac asthma: history of chestpain, crackles on auscultation)
- Chronic cough:
  - Diseases of airways and lungs:
    - » Bronchial asthma (recurrent episodes of cough, nocturnal symptoms)
    - » COPD (?smoker)
    - » Malignant disease (anorexia, haemoptysis)
    - » Lung disease e.g. bronchiectasis, interstitial lung disease
    - » Reactive Airways Dysfunction Syndrome (?exposure to pollutants)
  - Infectious disease:
    - » Tuberculosis (weight loss, night sweats, haemoptysis)
    - » Whooping cough (bouts of cough associated with vomiting)
  - Extrapulmonary diseases:
    - » Gastrointestinal reflux (burning retrosternal pain)
    - » Side effect of medication
    - » Chronic left ventricular failure (?history of heart disease, crackles on auscultation, peripheral edema with RVF)
    - » Malignancies e.g. lymphoma (?anorexia)

Note:

Always think of aspiration of foreign body in young children (< 5 years of age) who present with sudden onset of cough

## DIARRHEA AND DEHYDRATION

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### Description

Diarrhoea is the second leading cause of death among children under five years of age in middle and low income countries (the leading cause of death is pneumonia). Every year, more than 500,000 children die of diarrhoea. Diarrhoeal diseases could be prevented in most cases with access to clean water, hygiene and improved sanitation. Diarrhoea is defined as three or more soft or fluid defecations per day (or more than usual for this person). For children, however, this definition can be misleading. It is better to ask mothers whether their child's digestive habits have changed in recent days (e.g. watery stools three times a day instead of three times a week). Diarrhea is usually the symptom of infection with bacteria, viruses or parasites. It is transmitted through contaminated food or drinking water and from person to person due to poor hygiene. There are three typical forms of diarrhoea:

- acute watery diarrhoea
- acute bloody diarrhoea (dysentery) and
- Persistent diarrhoea (beyond a period of 14 days)

Diarrhoea, especially in children, is very often associated with dehydration and nutrient loss.



### Concerned persons

Children under the age of five in developing countries in particular suffer from diarrhoea up to four times a year. In adults, particular attention must be paid to HIV-positive persons who, like children, also frequently suffer from diarrhoea and the associated dehydration with all its consequences. The diseases occur above all in regions with inadequate sanitary facilities, polluted drinking water and contaminated food.



### Epidemiology

Every year about 1.7 billion children worldwide suffer from diarrhoea. 525,000 children die from this preventable disease. Diarrhoea accounts for eight percent of all deaths among children under the age of five, especially children in developing countries. Most deaths occur in children under the age of two in Southeast Asia and sub-Saharan Africa. Up to 40% of all people suffering from diarrhoea in developing countries suffer from amoebiasis.



### Cause

Inadequate sanitation, lack of hygiene and limited access to clean water promote the development of diarrhoeal diseases. The most important causes of diarrhoea are:

- bacterial pathogens

- Enterococci
- Escherichia coli (especially in children)
- Campylobacter (often asymptomatic infection)
- Shigellen
- Vibrio cholerae
- Salmonella
- viral pathogens
  - Rotaviruses
  - human caliciviruses
  - Adenoviruses
- Parasites
  - Cryptosporidium parvum
  - Giardia
  - Entamoeba histolytica (pathogen of amoebic dysentery)
  - Cyclospora cayetanensis

### Symptoms

The symptoms of diarrhea are:

- watery stools
- watery stool with blood (rarely also mucus) admixture
  - The amebiasis has a special course of disease. It manifests itself in slow onset diarrhoea with bloody stools and abdominal cramps. The symptoms can last for weeks. Abdominal defensive tension is evident, sometimes accompanied by fever. The attacks can recur over several years.

Diarrhoea often leads to dehydration, especially in children, the symptoms of which must be taken into account during the examination:

#### **moderate dehydration:**

- restlessness, irritability
- sunken eyes
- no tears
- dry mouth and tongue
- thirsty, drinks greedily
- Slow sinking back of the abdominal crease

#### **severe dehydration:**

- lethargy, unconsciousness
- eyes strongly sunken
- no tears
- very dry mouth and tongue
- Child drinks very slowly or hardly at all
- Abdominal wrinkle only disappears very slowly
- sunken fontanelle

## Diagnosis

You should ask the following questions to the mother, who will introduce you to a child with diarrhoea and questionable dehydration:

- Does the child have fever?
- Has blood been detected in the stool?
- Have worms been detected in the stool?
- How long have the symptoms been present?
- What other symptoms are present (coughing, vomiting, earache, seizures)?
- Was the child recently ill (e.g. measles)?
- What medication is the child currently taking?
- What is the child vaccinated against?
- Does the child absorb enough fluid?
- Is the child malnourished (determined by MUAC or Road to health chart)?

The following table provides an overview of the diagnosis of dehydration as part of diarrhoea:

<b>clinical signs</b>	<b>dehydrated</b>	<b>severely dehydrated</b>
General condition	restless, irritable	Lethargic, unconscious or floppy
Eyes	sunken	strongly sunken
Tears	not present	not present
Mouth and tongue	dry	very dry
Drinking	thirsty, greedily drinking	hardly drinks at all or only very slowly
Backward movement of the abdominal crease	slowly	very slowly
Fontanelle (if still open)	sunken	strongly sunken

During the clinical examination, the above symptoms are clarified. An examination of the abdominal crease supports the diagnosis: A crease is lifted from the side of the navel in the vertical direction. If this fold only recedes slowly or even very slowly, there is very probably a (severe) dehydration.

If a child with diarrhoea and dehydration shows the following signs, he or she should definitely be admitted to hospital:

- Somnolence or great restlessness

- Child is too weak to drink
- sunken eyes and significantly slower recovery of the skin fold on the abdomen

In order to diagnose amoebiasis, a stool sample should be examined microscopically for trophocytes, but this is usually not feasible under the conditions of our projects. If an amoebic abscess of the liver is suspected, an ultrasound examination will determine the diagnosis.



### Differential Diagnosis

The most important differential diagnoses of diarrhea are:

- Diarrhoea with fever and blood in stool
  - Shigellose
  - Campylobacter enterocolitis
  - Salmonella enterocolitis
  - E. coli hemorrhagic colitis (EHEC)
- Diarrhoea with fever without blood in stool
  - Salmonella enteritis
  - Campylobacter enteritis
  - Malaria
  - E. coli enteritis (EPEC)
  - Typhoid fever
  - Extraintestinal causes (especially in children)
- Diarrhoea without fever with blood in stool
  - amoebiasis
  - Schistosomiasis
  - Trichuris (whipworm infection)
- Diarrhoea without fever without blood in the stool
  - virus infection (e.g. rotavirus)
  - Food poisoning (e.g. with Staphylococcus aureus, Clostridium perfringens)
  - Travel diarrhoea
  - Giardia
  - Cholera



### Therapy

The most important therapeutic measure for diarrhoea with dehydration is rehydration. This should be done orally if possible and should be started without delay, because the lives of the patients and especially of the children are always threatened by dehydration. In the case of rehydration by infusion, there is a risk of overhydration. Rehydration is performed by means of ORS (oral rehydration salts), dissolved in water.

Treatment (according to WHO):

None or minimal dehydration (< 5%):

- Outpatient treatment (Treatment plan A)
  - Give as much fluid as the patient will take.
    - » Breastfed children: continue breast feeding; feed frequently and for longer periods; add ORS or plain water.
    - » Non-exclusively breastfed children: give ORS, clean water or food-based fluids (e.g. soup, rice water, yoghurt drinks, juice of young coconut).
  - Rehydration:
    - » Oral rehydration solution (ORS): for children up to 2 years: 50-100 mL after each loose stool; for children 2-10 years: 100-200 mL after each loose stool, children > 10 years: as much as tolerated
    - » ORS to be given at home: children up to 2 years: 500 mL/day, children 2-10 years: 1 litre/day, children > 10 years: 2 litres/day
    - » If child vomits, wait for 10 minutes then give ORS more slowly e.g. 1 spoonful every 2-3 minutes.
    - » Always explain the mother how to prepare and use ORS.
    - » Continue treatment until diarrhoea stops.
  - Zinc supplement: infants below 6 months: 10 mg/day, children 6 months to 5 years: 20 mg/day; give for 10 days.
  - Nutrition: for older children or adults carry on with food (nutritious, easily digestible e.g. cereal, meat, fish, fresh fruit juice, mashed banana); small amounts in frequent intervals; after illness: one additional meal daily for 2 weeks
  - Explain to mother to come back or go to hospital if there is no improvement within three days or deterioration at any time, fever or blood in the stools.

If ORS is not available teach the mother how to prepare a rehydration drink: 1 litre of boiled water, 1 level teaspoon of salt, 8 level teaspoons of sugar.

Moderate (some) dehydration (5-10%):

- Oral rehydration (Treatment plan B)
  - Within the first 4 hours of treatment give ORS according to weight or age:

<b>Age:</b>	<b>weight (kg):</b>	<b>ORS (mL)</b>
< 4 months	< 5	200 - 400
4 - 11 months	5 - 8	400 - 600
12 - 23 months	8 - 11	600 - 800
2 - 4 years	11 - 16	800 - 1200
5 - 14 years	16 - 30	1200 - 2200
> 14 years	> 30	2200 - 4000

- Initially (when dehydrated) adults can take up to 750 mL of ORS/hour, children up to 20 mL/kg/hour.
  - Encourage the mother to continue breastfeeding; for non-breastfed infants < 6 months give an additional 100-200 mL of clean water during the first 4 hours.
  - Give ORS in small amounts (use teaspoon for smaller children, cup for bigger children); if vomiting wait for 10 minutes then continue more slowly.
  - If patient wants more water than recommended above give more.
  - If the child's eyelids become oedematous stop ORS, give plain water or breast milk and treat as plan A (no dehydration) after oedema has stopped.
  - Check regularly to see if there are any problems.
- Reassess after 4 hours checking for signs of dehydration and treat accordingly (plan A, B or C):
  - If there is no dehydration (child less irritable, passing urine) start plan A.
  - If there are signs of some dehydration repeat plan B and start to offer food, milk or juice according to plan A.
  - If there are signs of severe dehydration start IVI and treat for plan C.
- Maintenance therapy (in addition to rehydration therapy):
  - Breastfed infants: mothers should continue breastfeeding as much and as long as the child wants.
  - Non-breastfed infants: give additional 100-200 mL of plain water during the rehydration period, afterwards give fluids normally taken by the child (e.g. formula feeds, water etc.).
  - Older children, adults: give as much fluids, e.g. water, juice, milk etc. as wanted and tolerated.
- Feeding:
  - During first 4 hours of rehydration do not give any food except breast milk.
  - After 4 hours if the child has still some dehydration and ORS is being given start food and give every 3-4 hours.
- If the mother leaves the clinic before the end of the rehydration period:
  - Explain to mother about the treatment and how to much ORS to give to finish initial 4-hour treatment period.
  - Give enough ORS for the completion of rehydration and 3 more days according to treatment plan A.
  - Explain to give ORS until diarrhoea stops, to give more food to prevent malnutrition and to bring the patient to hospital or clinic straight away if there is no improvement or deterioration.
  - All children older than 4-6 months should be given some food before being sent home.

- Give zinc supplements: infants < 6 months: 10 mg/day, children from 6 months to 5 years: 20 mg/day for 10 days.

Severe dehydration (> 10%):

- IV rehydration (Treatment plan C)
  - Admit to hospital for IV rehydration (e.g. with Ringer's Lactate solution)
    - » Start IVI immediately:
      - » Infants (< 12 months): 30 mL/kg in 1 hour (can be repeated once if radial pulse is still very weak or not detectable), then 70 mL/kg in 5 hours
      - » Children ? 12 months, adults: 30 mL/kg in 30 min (can be repeated once if radial pulse is still very weak or not detectable), then 70 mL/kg in 2 ½ hours
    - » Reassess every 15-30 minutes until strong radial pulse is present, then every 1-2 hours; if no improvement give fluids more rapidly.
    - » Give ORS (5 mL/kg/hour) as soon as the child will take fluids.
    - » If the parents refuse to take the child to hospital or transport is not readily available: evaluate patient after 3 hours (older child, adult) or 6 hours (infant < 6 months) using assessment chart (see above) and treat accordingly (treatment plan A, B or C).

In the case of prolonged diarrhoea and additional symptoms such as blood in the stool and/or fever, symptomatic treatment is not sufficient, but must be supplemented by cause-specific antibiotic therapy. The choice of antibiotic can be made under the conditions of limited diagnostic possibilities in the projects of the German Doctors without bacteriological stool examination according to the following symptom-oriented algorithm:

No fever, no blood	Fever, no blood	Fever and blood	No fever, but blood
viral (Rotavirus) >> ETEC, Cholera, Giardia  <ul style="list-style-type: none"> <li>• <u>only</u> severe cases of watery diarrhea: Ciprofloxacin 500mg bd (adults) or 20mg/kg bd (children) for 3d;</li> <li>• <u>only</u> if prolonged frothy and stinky diarrhea, flatus (Giardia): Metronidazol 500mg td (adults) or 10mg/kg td (children) for 7d</li> </ul>	Typhoid fever, salmonella  <ul style="list-style-type: none"> <li>• Severely ill: Ceftriaxon 2g iv (adults, children &gt;12y) or 50mg/kg (children), refer to hospital</li> <li>• Non-severe: Azithromycin 500mg (adults) or 10mg/kg (children) od for 3d + reevaluate</li> </ul>	Shigella > Campylobacter, Salmonella, EHEC  <ul style="list-style-type: none"> <li>• severely ill: Ceftriaxon 2g iv (adults, children &gt;12y) or 50mg/kg (children), refer to hospital</li> <li>• non-severe: Azitromycin 500mg od (adults) or 10mg/kg od (children) for 3d + reevaluate;               <ul style="list-style-type: none"> <li>• if not better: Ciprofloxacin 500mg bd (adults) or 20mg/kg bd (children) for 3d + reevaluate;                   <ul style="list-style-type: none"> <li>• if not better consider Metronidazol</li> </ul> </li> </ul> </li> </ul>	Amebiasis = <u>unusual</u> cause of bloody diarrhea in young children; also consider «fever and blood»  <ul style="list-style-type: none"> <li>• Metronidazol: 500mg td (adults) or 10mg/kg td (children) for 7d</li> <li>• <b>Additional Eradication of intestinal Amoebiasis:</b> Paromomycin 3 x 500 mg/d oral for 10 days</li> <li>• <b>Second line therapy:</b> tinidazol 2g od for 3 days additional paromomycin se above</li> </ul>

CAVE: Ciprofloxacin in children should only be used after harm-benefit considerations (cartilage damage) and is NOT to be given together with zinc!



## Prevention

One of the most important preventive measures against diarrhoea is to prevent the development of diarrhoea:

- Access to clean drinking water
- good sanitation
- frequent hand washing with soap, especially before food preparation and eating
- exclusive breastfeeding of babies during the first six months of life
- Cleaning food before consumption with clean drinking water
- Health education on the spread of pathogens
- Vaccination of children against rotaviruses

## DYSPNOEA

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### Description

- physiological (e.g. with blockage of airways, reduced blood supply and/or insufficient oxygenation of body and brain) or psychological in nature
- 4 stages depending on the symptoms:
  - no dyspnoea (no limitation of physical activity)
  - dyspnoea on strenuous exertion (slight limitation of physical activity)
  - dyspnoea on slight exertion (marked limitation of physical activity, comfortable at rest)
  - dyspnoea at rest (unable to carry out physical activity without discomfort)
- Often associated with cough
- Subjective symptom, therefore it is very important to take a detailed history



### Symptoms

#### Questions to ask:

- Acute or chronic?
- Sudden onset or slow progression?
- Recurrent episodes?
- Aggravating factors (e.g. worse on lying down, nocturnal dyspnoea)?
- Association with other symptoms or signs (weight loss, fever, cough and sputum, cyanosis, psychological signs)?
- Pre-existing diseases (e.g. pulmonary disease, heart disease, atopic disposition)?

## Diagnosis

### Clinical examination:

- Nutritional status (weight, ?anemia)
- Temperature
- Cardiovascular system (heart, lung, blood pressure)
- Gastrointestinal system (abdomen, spleen, liver)
- Neurological status
- Lymph nodes
- Mucus membranes (?cyanosis)
- Psychological status

### Investigations as necessary:

- AFB
- FBC
- Peak flow
- CXR
- SPO2
- Body weight (for follow up of therapy)

## Differential Diagnosis

- Diseases of airways/lungs:
  - Laryngitis, croup, aspiration (inspiratory stridor, acute, aspiration?)
  - Bronchial asthma (recurrent episodes, nocturnal attacks)
  - COPD/emphysema Pneumonia (?fever, sputum)
  - pneumonia
  - Tuberculosis (weight loss, haemoptysis, night sweats)
  - Whooping cough (bouts of cough associated with vomiting)
  - Malignant disease (anorexia, haemoptysis)
  - Pneumothorax (sudden onset, pain)
  - Fibrosis/pneumoconiosis (slow onset, history of farming or working in dusty environment e.g. coal dust, asbestos, silica dust)
  - Pleural effusion (pleuritic pain, fever)
- Diseases of the cardiovascular system:
  - Congestive cardiac failure(pulmonary/peripheral oedema)
  - Myocardial infarction (severe pain and distress, sudden onset)
  - Arrhythmias, myocarditis (irregular pulse)
  - valvular heart disease (cardiac murmur)
  - Pericarditis (pain, relieved by sitting forward, pericardial rub, heart failure with

pericardial tamponade)

- Pulmonary embolism (sudden onset, period of immobility?)
- Miscellaneous diseases:
  - anemia (?pallor, pregnancy, worms)
  - Pregnancy
  - Fever
  - Obesity, lack of exercise
  - Gross ascites (?history of bloody diarrhoea, jaundice)
  - Hyperthyroidism, retrosternal goiter (exophthalmos?, tachycardia)
  - Inhalation of toxins
  - Neurological disorder (weakness, muscle wasting, ataxia)
- Psychological illness:
  - Hyperventilation (agitation, excitement, sleeplessness)
  - Depression (difficulty sleeping, sadness, difficulty thinking and concentrating, apathy, history of traumatic event in the past)

## FATIGUE

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### Description

- Very common complaint during consultation
- Often described as lack of energy, weakness, tired all the time
- Mainly psychological in nature, but organic illness must be considered
- A very subjective symptom – therefore: take a detailed history

Questions to ask:

- Duration of symptoms (recent, prolonged, chronic)?
- Onset (sudden, progressive)?
- Recovery period (short, long)?
- Type of fatigue (physical, mental, sexual)?
- Time of fatigue (morning, evening)?
- Medication? (antidepressants,  $\beta$ -blocker, antihistamines)
- Alcohol or drug abuse?
- Association with other symptoms or clinical signs (weight loss, fever, loss of appetite, psychological signs)
- Pregnancy?

### Diagnosis

Clinical examination:

- Nutritional status (weight, signs of anemia or vitamin deficiency)

- Temperature
- Cardiovascular system (heart, lung, blood pressure)
- Gastrointestinal system (abdomen, spleen, liver)
- Lymph nodes
- Mucus membranes, skin
- Psychological status

Investigations as necessary:

- Urinalysis
- Creatinine, liver enzymes
- Blood sugar
- FBC
- AFB
- CXR



#### Differential Diagnosis

- Viral illness (history of gastroenteritis, severe cold)
- anemia (pallor, malnutrition, pregnancy, menorrhagia)
- Parasite infections (anemia, abdominal pain, worms, hepato-splenomegaly)
- Heart failure (dyspnoea, murmur, crackles on auscultation)
- Asthma/COPD (dyspnoea, wheezing, nocturnal symptoms)
- Tuberculosis (cough, haemoptysis, weight loss, night sweats)
- Diabetes mellitus (polyuria, polydipsia)
- Malignant disease (melaena, haemoptysis, anorexia, fever, recurrent infections, lymphadenopathy, stool irregularities)
- Hepatitis (jaundice)
- Neurological disorder (?weakness, muscle wasting, visual defects, ataxia)
- Psychological illness (difficulty sleeping, difficulty thinking and concentrating, apathy)

#### **Note:**

Very often fatigue is a reaction to living under difficult conditions (e.g. heavy work, lack of money, insufficient food) or traumatic events like severe illness or death in the family. Being able to talk to someone who listens can be very helpful.

## FEVER

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### Description

Axillary temperature  $> 37.0^{\circ}\text{C}$  in the morning,  $> 38^{\circ}\text{C}$  in the evening; rectal  $> 37.5^{\circ}\text{C}$  in the morning,  $> 38.5^{\circ}\text{C}$  in the evening



### Concerned persons

- Common in children, therefore it is very important to take a detailed history
- Complications of fever in the newborn/infant: convulsions, dehydration, malignant hyperthermia with collapse, coma



### Diagnosis

#### Clinical examination:

- Nutritional status (weight, signs of anemia or vitamin deficiency)
- Temperature
- Ears, throat
- Mucus membranes, skin, teeth
- Cardiovascular system (heart, lung, blood pressure)
- Gastrointestinal system (abdomen, spleen, liver)
- Neurological status
- Lymph nodes

#### Investigations as necessary:

- Urinalysis
- Blood sugar
- Blood smear (malaria parasites)
- FBC
- AFB
- Abdominal ultrasound
- CXR



### Differential Diagnosis

- Acute:
  - Malaria (?endemic areas; high fever, chilling, headache)
  - Typhoid fever (slowly rising fever; headache, cough, constipation, relative bradycardia, abdominal pain, diarrhoea)
  - Meningitis, meningococcal meningitis (high fever, neck stiffness, neurological signs)
  - Septicaemia (shock, toxemia, jaundice)

- Dengue fever (haemorrhagical symptoms, thrombocytopenia)
- Hepatitis (jaundice, dark urine)
- Look for focal signs, e.g.:
  - » Tonsillitis (lymphadenopathy, exudate on tonsils)
  - » Otitis (fluid behind ear drum)
  - » Pneumonia, bronchiolitis (crackles, wheezes, tachypnea)
  - » Dental abscess (decayed teeth)
  - » Measles (fever, conjunctivitis, rash)
  - » Cystitis, pyelonephritis (dysuria, haematuria, proteinuria)
  - » Abscess, osteomyelitis (painful swelling)
  - » Rheumatic fever (joint pain, joint swelling, rash)
- Prolonged fever (more than 2 weeks):
  - Tuberculosis (low grade fever, productive cough, night-sweats)
  - Amoebic liver abscess (hepatomegaly, nausea, vomiting)
  - Schistosoma mansoni/haematobium/japonicum infections (?bloody diarrhoea, haematuria, hepatosplenomegaly)
  - Malaria (endemic areas)
  - UTI (dysuria, haematuria)
  - Filariasis (lymphangitis of limbs or scrotum)
  - HIV-infections (anorexia, recurrent infections, AIDS related symptoms)
  - Collagenosis and others
- Fever during the last month of pregnancy always think of:
  - Malaria
  - Pyelonephritis

**Note:**

With prolonged fever always consider that treatment might not be working (e.g. because of resistant bacteria).

If possible always check urine in children with fever > 24 hours!

Always consider there might be more than one reason for fever.

## JAUNDICE

### Description

- Yellow discolouration of skin, sclerae and mucosa due to raised bilirubin levels
- Three different origins: pre-hepatic, hepatocellular, post-hepatic
- Common in the tropics

- Often associated with liver disease



### Concerned persons

An icterus can affect any person who suffers from liver or bile disease or haemolytic anemia. Newborns often have an icterus, which - in most cases - disappears within the first seven days of life (exception: pathological icterus, e.g. due to a metabolic disease). Hepatitis A: Common in developing countries due to poor housing and living conditions, lack of proper disposal of rubbish and poor standards of sanitation and hygiene,

Transmission: faecal-oral rout. Mainly children affected, asymptomatic in 50-90%; adults: fulminant forms possible

Hepatitis B: Transmission: parenteral route (blood and blood products, IV-drugs), sexual intercourse (65%), mother-to-child transmission.

Hepatitis C: Transmission: parenteral route (e.g. shared needles in drug users, multiple use of needles for medical purposes), rarely with sexual inter-course.

Heaptitis D: Transmission: parenteral route with blood and blood products, sexual inter-course. Only in patients with hepatitis B or as superinfection in chronic HbsAg carriers.

Hepatitis E: Transmission: faecal-oral route, possible: zoonotic spread (virus found in cows, pigs, goat and other animals). Severe illness in pregnant women: mortality: 20% when infection occurs in the third trimester.



### Epidemiology

Since jaundice is a symptom of various diseases, there are no epidemiological data on it. However, the significance becomes clear when considering the prevalence of important underlying diseases:

Hepatitis A is so widespread in developing countries that almost all people already experience this infection in childhood and adolescence.

The prevalence of hepatitis B is highest in the West Pacific region and Africa, where it is around 6%. In the Mediterranean Region, South-East Asia and the European Region, WHO estimates prevalence at 3.3%, 2.0% and 1.6% respectively. Chronic infection develops in 5-10% of cases. Hepatitis B is the leading cause of hepatocellular carcinoma worldwide.

For the epidemiology of sickle cell anemia see chapter Anemia.



### Symptoms

In addition to yellowing of the skin, mucous membranes and sclera, other symptoms may occur, depending on the underlying disease:

- discoloured stools
- dark urine
- pruritus
- pain (especially in posthepatic icterus, then often postprandial)

- fever
- weight loss
- muscle loss

### Diagnosis

Questions to ask:

- Age of patient (?neonate)?
  - Duration of symptoms (?long lasting, recurrent episodes)?
  - Concurrent medication (?paracetamol, barbiturates, methyldopa)?
  - Alcohol or drug abuse?
  - Pregnancy?
  - Aggravating factors (e.g. worse after fatty food)?
  - Associated with other symptoms or clinical signs (?fever, itching, scratch marks, palmar erythema, spider naevi, pale stools, gynaecomastia, loss of body hair, hepatomegaly, ascites, oedema, muscle wasting)?
  - Pre-existing diseases (e.g. gallstones, malignancy, heart disease, asthma/COPD, renal problems)?
- FBC
- LFT
- Abdominal ultrasound
- Blood smear

### Differential Diagnosis

The most important differential diagnoses of prehepatic, intra- and posthepatic jaundice are listed below:

- Prehepatic jaundice:
  - Haemolytic anemia (?anemia, splenomegaly, joint pains)
- Hepatocellular jaundice:
  - Acute viral hepatitis (?fever, nausea, tender hepatomegaly, splenomegaly, arthralgia)
  - Chronic hepatitis (?hepatosplenomegaly, spider naevi, fatigue)
  - Liver cirrhosis (?history of hepatitis, hepatic foetor, liver flap: tremor worse by hand extension, ascites, haematemesis, encephalopathy)
  - Hepatocellular carcinoma
  - Alcoholic liver disease (?history)
  - Toxic hepatitis due to medication or drugs (?history)
- Posthepatic jaundice:

- Biliary obstruction e.g. gallstones (?colicky pain)
- Helminthiasis with ascaris (?worms)
- Infection e.g. cholangitis, pancreatitis, abscess (?fever, ?high blood sugar)

The differential diagnosis in our projects must be based on the available therapeutic options. Therefore, malaria must be excluded as a matter of priority if there are clinical suspicions. Complex and possibly stressful examinations should be avoided if no treatment consequences can be expected from the result. This also applies to the differentiation of hepatitis A to E by laboratory chemistry. Therefore, we limit ourselves to the above-mentioned examinations, with the help of which we can usually clarify the differential diagnosis of the icterus to such an extent that a decision on whether and how treatment is possible.

### Therapy

The therapy of an icterus is based on the underlying disease.

- Specific treatment of hepatitis A and B is not possible, and isolation of newly infected hepatitis patients in our projects is also unrealistic. This makes it all the more sensible to vaccinate against hepatitis B in good time. The medical treatment of hepatitis C, which is already almost impossible to finance in Germany, cannot be carried out in our projects for financial reasons.
- The treatment of sickle cell anemia is carried out by administration of folic acid (children < 1 year 0.5 mg/kg 1x/d, children > 1 year and adults 5mg/d for up to 4 months).
- For the treatment of the other forms of haemolytic anemia see chapter anemia.
- Newborns with high bilirubin levels (> 20 mg/dl) must be treated with phototherapy under inpatient conditions where this therapy is available.
- Depending on the cause, posthepatic forms of icterus often require surgical treatment where it is available for our patients.
- A treatment of malignant causes of icterus is not feasible in any of our projects, here we have to limit ourselves to symptomatic pain therapy.

### Prevention

- Sleeping under a mosquito net
- Vaccination against hepatitis B
- Anti-D prophylaxis post partum in Rh+ child and Rh- mother
- 6-GPD-deficiency: Avoid primaquine and sulfonamides, do not eat broad beans.
- Avoidance of alcohol abuse

Special preventive measures against hepatitis:

- Every pregnant mother should be tested for HbsAg, either by us or at the official an-

tenatal checkup so that babies can be immunized straight after birth when possible.

- Good hygiene (sanitary conditions, safe disposal of faeces)
- Exclusive use of single use sterile needles
- Avoidance of application of IV- or IM-medication when oral medicine is effective and available
- In acute cases or if chronic carrier of B, C, D: avoid unprotected sexual intercourse
- Recommend vaccination for HA and HB, if feasible

## NAUSEA AND VOMITING

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### Description

- Protective reflexes of the body preventing the entry of toxins
- Many organic causes
- often psychological component
- Most of the time self-limiting but with risk of dehydration: -> attention should be given early especially to young children and older patients.
- Often associated with diarrhoea
- Questions to ask:
  - Acute or longer lasting?
  - Recurrent episodes?
  - Time (early morning)?
  - Aggravating factors (e.g. worse with or after food)?
  - Associated with pain?
  - Concurrent medication (NSAIDs, antibiotics, opioids, theophylline, digoxin)?
  - History of alcohol or drug abuse?
  - Smoking?
  - Pregnancy?
  - Association with other symptoms and signs (?lethargy, weight loss, haematemesis, melaena, faecal vomit, vertigo, psychological signs)?
  - Pre-existing diseases (e.g. diabetes mellitus, migraine, malignancy, gallstones, heart disease, asthma/ COPD, renal problems)?

**Note:**

To assess the degree of dehydration in a child it is very important to ask the mother about decrease in urination or thirst and to assess the condition (?alert, lethargic), eyes (?sunken), skin turgor (?dry) and fontanelle (in infants, ?sunken).  
See Dehydration and Rehydration

 Symptoms

- General condition (?lethargic)
- Mucous membranes, skin (?dry)
- Nutritional status (weight, ?signs of anemia)
- Temperature
- Cardiovascular system (heart, blood pressure, heart rhythm and -rate)
- Gastrointestinal system (abdomen, spleen, liver)
- Neurological status (neck, eyes, strength, reflexes, nystagmus)
- Psychological state

 Diagnosis

- Urinalysis
- Creatinine and FBC, if available
- Blood sugar (!)
- Abdominal ultrasound, if available

 Differential diagnosis:

- Abdominal disorders:
  - Gastroenteritis (viral, parasitic; ?with diarrhoea, ?other people affected)
  - Gastritis or Peptic ulcer
  - Gastroesophageal reflux (?burning retrosternal sensation)
  - Acute abdominal emergencies e.g. appendicitis, perforated ulcer, ectopic pregnancy (?fever, severe abdominal pain, occasionally sudden onset, getting worse, rigid abdomen)
  - Intestinal obstruction (?faecal vomit, distended rigid abdomen, ?passage of round-worms [Ascariasis])
  - Cholecystitis (?pain right upper abdomen, esp. with fatty food)
  - Hepatitis (?jaundice)
  - Pancreatitis (severe acute central abdominal pain)
  - Malignant disease (abdominal mass, ascites, recent weight loss)
- Central nervous disorders:

- Migraine (?recurrent episodes, headaches, aura, visual disturbance)
- Vertigo, motion sickness, labyrinthitis disorders (?symptoms worse on moving, nystagmus)
- Meningitis, encephalitis (?fever, severe headache, neck-stiffness, rash, signs of HIV?)
- Metabolic disorders:
  - Diabetic ketoacidosis (dehydration, hyper-ventilation, acidosis)
  - Hypoglycaemia
  - Uraemia (?pallor, oedema, hypertension)
- Pregnancy
  - Morning sickness (?missed periods)
  - Hyperemesis gravidarum
- Adverse effects of drugs
- Toxins
  - Food poisoning (?other people affected, associated with diarrhoea)
  - Alcohol abuse (?early morning vomit)
  - Medication, intoxication, drug abuse (?history)
- Psychiatric causes:
  - Functional dyspepsia, panic attack, depression (?recurrent multiple unrelated complaints, history of traumatic life events)
- Rare diagnoses:
  - Increased intracranial pressure, uraemia, acute pyelonephritis, lactose intolerance

### Therapy

It's an often self-limited symptom. In other cases: treat underlying cause and/or consider Metoclopramide or antihistamines like Dimenhydrinat, Diphenhydramine; Promethazine; Glucose if hypoglycaemic, ORS or iv-fluids or NG-tube if severely dehydrated

## SEIZURES

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### Description

- Usually presenting as grand mal (tonic-clonic movement of all four limbs) with loss of consciousness, occasionally with tongue bite and urinary incontinence due to acute disturbance of the brain; can be provoked or unprovoked.

### Concerned persons

- General population: 8-10% lifetime risk of one seizure, 3% risk of epilepsy

## Symptoms

### Questions to ask:

- Any previous events?
- Family history?
- Any post-ictal symptoms?
- Association with clinical signs e.g. fever?
- Alcohol or drug abuse?
- Concurrent medication (?Theophylline, Tramadol)
- Any coexisting illness?

## Diagnosis

### Investigations for acute seizures:

- None. But assure that patient does not hurt himself

### Clinical examination:

- Nutritional status (weight)
- Temperature
- Cardiovascular system (heart, lung, blood pressure)
- Neurological status (pupils, reflexes, power, ?neck stiffness etc.)
- Gastrointestinal system (abdomen, spleen, liver, uterus)
- Psychological status

## Differential Diagnosis

- Febrile convulsion (child, viral illness)
- Meningitis/encephalitis (fever, neck-stiffness. Always to be considered in children aged 18 months to 6 years)
- Hypoglycaemia (!)
- Eclampsia (pregnancy)
- Epilepsy (?aura, family history)
- Brain injury/tumor/abscess
- Infectious diseases (malaria, tuberculosis, cysticercosis, schistosomiasis etc.)
- Intracranial bleeding (sudden onset of severe headache)
- Excessive intake of alcohol or drugs/ withdrawal (?history)
- Medication side effects
- Severe psychological stress, sleep deprivation (?history)
- Transient ischaemic attack/ cerebro-vascular accident (stroke)
- Cardiac arrhythmias (irregular pulse, murmur)
- Complex migraine (history of migraine, aura or visual disturbance?)

- Metabolic encephalopathy (?suggestion of electrolyte disturbance)

**Note:**

Always check the blood sugar in a patient presenting with epileptic fit or loss of consciousness! Refer patient to hospital urgently if meningitis or eclampsia is suspected!

## VAGINAL DISCHARGE



### Differential Diagnosis

- *Candida albicans*
- Bacterial vaginosis (*Gardnerella vaginalis* + *Mycoplasma hominis*)
- Trichomoniasis
- Cervix Npl.
- Foreign body in smaller girls



### Therapy

- In case of vaginal mycosis
  - Clotrimazole supp. vag. (200 mg) OD in the evening for 3 days.
  - Partnertherapy (Clotrimazole creme BD 7 d)
- In case of bacterial vaginosis
  - Metronidazol 400 mg BD for 7 days.
  - Try to avoid this treatment until week 20 in pregnancy because of increased risk for abortion. If possible use of e.g. Clindamycin Creme vaginally (OD 5g 2%) for 7 days or Metronidazol 1 g intravaginally OD for 2 days (not for breastfeeding mothers).
  - Partnertherapy not necessary.
- In case of Trichomoniasis
  - Metronidazol 2 g SD orally.
  - In pregnancy Metronidazol 400 mg BD orally for 7 days.
  - Partnertherapy necessary.
- In case a specific diagnose can not be found treat with Metronidazole 2 g single dose (can also be given in pregnancy if benefits outweigh the risk) Plus Clotrimazole vaginal pessary 500 mg single dose or 200 mg for 3 days
- In case of suspected tumor of the cervix send patient
  - for VIA/VILI (visual inspection acid/visual inspection Lugol) and
  - if tumor can be verified through speculum or vaginal palpation: histology is necessary.

## WOUNDS



### Description

General guidelines:

- Wounds older than 6 hours should not be sutured; in remote areas this rule can be stretched to up to 24 hours if the patient can be observed afterwards for any sign of infection.
- Infected wound or incised abscesses should never be sutured.
- Wounds due to bites of animals or humans should not be sutured.
- "Open fracture" means that there is a break in the skin overlying the fracture.
- Always give antitetanus prophylaxis if not fully immunized.



### Therapy

- Clean wound and surrounding area (e.g. with povidone iodine solution or Ringer's Lactate solution).
- Anaesthetize with lidocaine 1% or 2%.
- Explore wound to exclude foreign bodies, underlying fracture, involvement of other structures e.g. tendons, major blood vessels etc.
- Clean wound thoroughly.
- Use interrupted sutures (non-resorbable sutures e.g. silk for skin, resorbable sutures e.g. chromic catgut for subcutaneous tissues).
- Use finer suture material e.g. 3/0 for face, thicker material e.g. 2/0 for scalp or limbs (the higher the numbers the finer is the suture material).
- Removal of sutures: face: after 5 days; other wounds: after 7 days; wounds overlying joints: after 10 days

### Note:

When treating wounds do not forget to give tetanus prophylaxis and, with dirty or infected wounds, antibiotics e.g. Cefuroxime or Erythromycin.



## EMERGENCIES

- Due to limited resources emergency treatment should only be done on a basic level.
- Advanced treatment e.g. intubation is not indicated because of poor outcome especially while working in remote areas.
- It is our intention to stabilize the patient with basic means and organize transport to the nearest hospital as soon as possible.

### Note:

Make sure that the patient is put in the correct position, kept warm and as calm and free of pain as possible.

Even in emergencies it is nonetheless very important to take a proper history!

## ANAPHYLAXIS / ANAPHYLACTIC SHOCK

### Description

Severe life-threatening, generalized or systemic hypersensitivity reaction

### Cause

- Can be associated with insect bites, certain food (e.g. eggs, fish, nuts, esp. peanuts etc.).
- Also associated with medical products, e.g. vaccines, antibiotics, blood products, aspirin etc.
- More likely after parenteral administration of medication

### Symptoms

- Erythema, urticaria
- Hypotension, tachycardia
- Bronchospasm, laryngospasm
- Sudden onset and rapid progression of symptoms

### Therapy

- Stop causative agent straight away.
- Lie patient flat, raise feet; if unconscious: recovery position.
- Give oxygen if available.
- Give Adrenalin (1mg/ml) diluted in one syringe with 9 ml NaCl solution 0,9% straight away IM (anterolateral thigh); (also possible, but less effective: SC) (do not waste time looking for a vein where IM injection can be successful):

- up to 6 years            1.5 ml
- 6-12 years                3.0 ml
- > 12 years & adults    5.0 ml
- Can be repeated every 5 minutes according to pulse and blood pressure.
- In rare cases e.g. severely ill patients, when adequate circulation may not be maintained in the periphery, adrenaline can also be given IV:
  - Adrenaline 1 : 10 000 (100 mcg/ml) IV:
    - » Adults: titrate 50 mcg (0.5 ml) boluses according to response
    - » Children: titrate 0.01 mg/kg (0.1 ml/kg) boluses according to response.
  - After initial resuscitation give hydrocortisone:
    - » Adults: 2 mg/kg IM or slow IV up to qid prn
    - » Children 4-8 mg/kg stat. IM or slow IV, then 2 mg/kg up to qid prn
  - Give antihistamines e.g.
    - » Diphenhydramine:
      - » Adults, children: 1-2 mg/kg slowly IV or IM
      - » Can be given up to tid prn
- Monitor pulse and blood pressure closely.

**Note:**

Treatment with antihistamines cannot replace treatment with adrenaline: they do not relieve bronchoconstriction or shock; they are only effective for urticaria and itching.

## ASPIRATION OF FOREIGN BODY

### Symptoms

- Sudden onset of cough, cyanosis
- Stridor (inspiratory, expiratory)
- Paradoxical breathing

### Therapy

- Check mouth and throat and remove any obvious obstruction.
- Heimlich manoeuvre (abdominal thrust)

#### Heimlich manoeuvre (abdominal thrust):

- Patient lying on the back: kneel astride the casualty, place heel of one hand on abdomen between umbilicus and xiphoid and cover with the other hand. Press sharply inwards upwards towards the chest up to five times (imitating cough to expel the

foreign body).

- If the patient is upright stand behind the patient, place right fist below the xiphoid, cover it with the left hand; pull sharply and quickly inwards and upwards towards the chest.

#### Modified Heimlich manoeuvre for infants, children:

- Infants, children < 1 year: lay infant on your forearm or thigh on the stomach in head down position; give 5 blows on the back between the shoulder blades with the heel of the hand. If obstruction persists turn child and give 5 chest thrusts in the middle of the breast bone (in infants with 2 fingers, in older children with the heel of the hand). Continue until foreign body is expelled.
- Children > 1 year: give 5 blows to the back of the child sitting, kneeling or lying on the stomach. If obstruction persists continue with abdominal thrust (see adults).

## LOSS OF CONSCIOUSNESS (LOC)

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### Symptoms

#### Questions to ask:

- Time of LOC
- History of pain, fever, trauma
- Past medical history
- History of medication, drug or alcohol abuse

### Diagnosis

#### Clinical examination:

- Breathing
- Cyanosis?
- Pulse palpable?
- Blood pressure
- Skin (?dry, clammy)
- Temperature
- Pupils (?dilated, reacting to light)
- ?Reaction to pain

#### Investigations

- Blood sugar (BS-stix, ?hypoglycaemia) (!!)

### Differential Diagnosis

- Metabolic disorder e.g. hypoglycaemia (!!!)
- Meningitis, cerebral malaria, cerebral schistosomiasis

- Intoxication, drugs
- Epilepsy

#### Therapy

- Recovery position
- Tilt head back to open the airway (Esmarch's grip)
- Give oxygen if available.
- Monitor pulse and blood pressure closely.
- If hypoglycaemia give:
  - Adults: 20 ml of 40% glucose slowly IV
  - Children: 5 ml/kg of 10% glucose slowly IV
- Hypertensive crisis:
  - Give 1-2 puffs of GTN-spray SL to lower blood pressure carefully.

## SEVERE CHEST PAIN

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#### Symptoms

- Distress
- Dyspnoea
- Pallor

#### Differential Diagnosis

- Myocardial infarction, pulmonary embolism, trauma

#### Therapy

- Sit patient up
- Give oxygen if available
- GTN-spray 2 puffs stat sublingual if systolic BP > 100 mmHg
- Put up IV line
- Aspirin 500 mg stat
- If required:
  - Diazepam 5-10 mg IV
  - Tramadol 2 mg/kg IV or

## SNAKE BITE

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#### Description

Should be suspected if a patient – esp. farmers, field workers, hunters etc. - presents

with severe pain, redness and swelling of a limb or unexplained illness with severe pain, bleeding and neurological problems.

### Symptoms

- Swelling of limb
- Necrosis
- Shock
- Bleeding e.g. from gums
- Neurological symptoms e.g. paralysis, difficulties in swallowing or talking or breathing
- ?visible puncture marks

### Therapy

- Lay patient down, affected limb below heart level, apply firm bandage to affected limb from toes or fingers to proximal site of bite; immobilize with splint
- Clean wound carefully
- Put up IV infusion
- Analgetics prn
- Urgent transport to hospital, if possible
- If no hospital in reach: wound cleansing, amoxiclav, tetanus prophylaxis, bed rest as described above
- Be aware of possible anaphylactic reactions
- Do not cut the wound, suck out the venom or apply a tourniquet.

## TRAUMA

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### Therapy

- Management:
  - Remove from danger area.
  - Assess injuries of patient.
  - Observe for loss of consciousness (LOC).
  - Check pulse and blood pressure.
  - Check chest (signs of pneumothorax e.g. respiratory distress, reduced breath sounds, reduced chest movements, paradoxical breathing).
  - Put patient in appropriate position.
- Treatment:
  - Undress and keep patient warm.
  - Position:

- » If conscious and shocked: raise legs.
- » LOC and breathing: recovery position
- » Breathing and conscious: position on back
- » If respiratory problems and conscious: sitting or half-sitting position if tolerated
- » If necessary: stabilize neck.
- Give oxygen if available.
- Monitor pulse and blood pressure closely.
- Bleeding wounds: apply pressure bandage.
- Cover wounds with sterile dressing.
- Splint injured limbs.
- Large IV cannula (16 G in adults); if in shock give Ringer's Lactate solution 1-3 litres IV
- Give analgesics e.g.
  - » Tramadol IV, IO, IM, PO:
    - » Children 1-11 years: 1-2 mg/kg up to tid prn
    - » Children >12 years, adults: 2 mg/kg up to tid prn
- Ketamine IV, IO:
  - » Adults, children: 0.25 – 0.5 – 1 mg/kg

## REHYDRATION

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### Therapy

For child in shock:

- Give Ringer's Lactate solution IV:
  - 20 ml/kg in the first hour, repeat if no improvement
  - 2nd to 4th hour: 12-15 ml/kg/h
  - From 5th hour: 6-10 ml/kg/h, reassess and speed up if patient deteriorates.

### Intraosseous infusion

- Should only be used in an emergency if intravenous access is not available within a short period of time.
- Dosages and action of drugs and intravenous fluids comparable to IV administration.
- Puncture site: antero-medial aspect of tibia, at the junction of upper and medial third.
- Use intraosseous needle if available.
- In young children: use of large-bore hypodermic needle or butterfly needle possible.
- Important: thorough disinfection of injection site
- Insert needle at 90o angle to tibia, stop when decrease of resistance is felt or aspira-

tion of blood is possible.

- Stabilize needle and secure with tape.
- Check whether infusion is running correctly and there is no swelling of skin surrounding the injection site or calf.
- Insert IV-line as soon as possible and discontinue intraosseous infusion.



## ACUTE RESPIRATORY INFECTIONS (ARI)

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### Description

Divided into:

- upper respiratory tract infections (URTI, affecting nose, ears, throat, pharynx and larynx) and
- lower respiratory tract infections (LRTI; affecting bronchi, bronchioli or lungs)

### Concerned persons

1. Very common, esp. in infancy and childhood
2. Associated with poor housing, poor hygiene, inadequate food and clothing
3. Incidence of chronic respiratory diseases: rising due to air pollution in big cities
4. High mortality with LRTI (20% of all the deaths in children under 5 years of age)
5. High risk: low birth weight children, children under 5 years of age with insufficient immunization status, children and adults with anaemia and malnutrition or concomitant diseases e.g. measles, pulmonary tuberculosis or HIV
6. Risk factors for adults: smoking, alcohol, diabetes

### Epidemiology

- worldwide

### Cause

- see sub Chapters URTI and LRTI

### Symptoms

- see sub Chapters URTI and LRTI

### Diagnosis

Taking a detailed history, examining the patient properly and making a diagnosis (to differentiate between simple viral infection and severe pneumonia) and starting adequate treatment are of utmost importance.

Questions to ask in children:

- How is the child (well, responding, sleepy, drinking or eating well)?
  - Increased respiratory rate?
  - Any wheeze?
  - Chest-wall retractions?
  - Preexisting illnesses (asthma, PTB, allergies, malnourishment, HIV etc)?

## LOWER RESPIRATORY TRACT INFECTION (LRTI)

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### BRONCHITIS

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#### Symptoms

- Fever, barking cough
  - Clear frothy sputum; can get purulent with secondary bacterial infection.
  - Wheezy chest
  - Normal respiratory rate at rest:
    - » Infants < 2 months: < 60/min
    - » Children 2-11 months: < 50/min
    - » Children 1-5 years: < 40/min
    - » Children 6-8 years: < 30/min

If the respiratory rate is higher, pneumonia is likely.

#### Diagnosis

- count the respiration rate, auscultate the lungs, ask for sputum description, check temp (and SPO2 if feasible)

#### Differential Diagnosis

- asthma, PTB, smoker's lung, COPD, pneumonia
- children: bronchiolitis, food or foreign body aspiration, pertussis

#### Therapy

- Antibiotics only indicated with yellow/ green sputum, persistent cough or suspected pneumonia (see below); otherwise: see treatment for URTI.

## PNEUMONIA

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#### Cause

- Pneumococci, Haemophilus influenzae, staphylococci, also: viruses, Mycoplasma pneumoniae; with AIDS: also Pneumocystis carinii
  - Occasionally due to inhaled foreign body (history important – sudden onset?)

#### Symptoms

- Fever, tachycardia
  - Tachypnoea: respiratory rate: children < 2 months: > 60/min;



### Differential Diagnosis

- Foreign body (?sudden onset)
  - Tuberculosis
  - Croup
  - Epiglottitis
  - Asthma/COPD
  - Parasitic lung infection (lung passage of ascaris, hookworm, strongyloides)

## UPPER RESPIRATORY TRACT INFECTION (URTI; COMMON COLD)



### Cause

- Mainly viruses e.g. respiratory syncytial virus (RSV) or adenovirus
  - Risk of bacterial superinfection e.g. with Haemophilus influenzae, pneumococci, streptococci or Staphylococcus aureus



### Symptoms

- Cough, runny nose, sore throat
  - Occasionally raised temperature
  - Risk of infection spreading to lower respiratory tract



### Diagnosis

- respiratory rate, temperature, heart rate, general condition:
  - a runny nose and no tachypnea nearly always indicates a viral, non-bacterial cause



### Therapy

- Increase fluid intake.
  - Encourage breastfeeding.
  - Antibiotics not necessary, but give if superinfected (in practice, if fever lasts for ? 5 days)
  - Saline nose drops for blocked nose (0.9% NaCl)
  - Paracetamol for pain or pyrexia
  - Children: 30 mg/kg in 3-4 divided doses
  - Adults: 500 mg qid
  - Fever: patient should be sponged down with lukewarm water.
  - Do not expose patient to smoke in the house (indoor pollution)

- 2-11 months: > 50/min; 1-2 years: > 40/min; 6-8 years > 30/min
- Dyspnoea, chest-wall retractions, nasal flaring, cyanosis
- In children: difficulty feeding

### Diagnosis

Respiratory rate, general condition, temperature, auscultation (rales, coarse crackles, bronchial breath sound, grunting?), percussion (grunting?)

### Differential diagnosis

Malaria, Asthma, cardiac failure, aspiration

### Therapy

- Do not wait for x-ray to confirm diagnosis.
  - Antibiotics indicated:
    - » Amoxicillin:
      - » Children: 50 mg/kg in 3 divided doses
      - » Adults: 500-1000 mg tid or
    - » Erythromycin:
      - » Children: 50 mg/kg in 3 divided doses
      - » Adults: 500 mg qid
    - » Duration of treatment: 7 days
  - Give oxygen if necessary.
  - Increase fluid intake.
  - Encourage breastfeeding.
  - Fever:
    - » Take clothes off; sponge down with lukewarm water.
    - » Paracetamol:
      - » Children: 30 mg/kg in 3-4 divided doses
      - » Adults: 500 mg qid
      - » Give with temperature > 39° C.
    - » Severe cases: refer to hospital for treatment.
    - » Persistent symptoms: refer for sputum examination and/or x-ray to exclude tuberculosis.

There is no indication for codeine or other cough suppressants.



## Prevention

- Advice regarding appropriate clothing
  - Advice regarding breastfeeding of children
  - Check immunization status of children and immunize as required after recovery.
  - Advice regarding food, hygiene

## ACUTE LARYNGO-TRACHEOBRONCHITIS (CROUP)

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## Description

fever, hoarse voice, barking cough

### 2. Concerned persons

- Most common cause of upper respiratory obstruction
- Mainly in children from 3 months to 5 years
- severe episodes mainly in children < 2 years of age



## Cause

- Mainly viruses (influenza, para-influenza, respiratory syncytial virus)
  - rarely: associated with measles



## Symptoms

- Initially mild symptoms, can get progressively worse.
  - Symptoms usually worse at night
    - » Runny nose
    - » Mild fever
    - » Pharyngitis
  - Mild croup:
    - » Hoarse voice
    - » Barking cough
    - » Inspiratory stridor when agitated
  - Severe croup:
    - » Signs of severe illness: pallor, chest-wall retractions, nasal flaring, increased respiratory rate
    - » Stridor at rest
    - » Tachypnoea
    - » Cyanosis
    - » Fatigue

## Diagnosis

By clinical examination

### Differential diagnosis

- Inhalation of foreign body
  - Retropharyngeal abscess
  - Diphtheria
  - Acute epiglottitis

### Therapy

- Mild croup:
  - Antipyretics e.g. paracetamol
  - Encourage oral fluids
  - Rest
  - moisten the air around child's bed, if feasible, avoid dust etc
- Severe croup:
  - Keep the child in upright position.
  - Try to keep child calm.
  - Prednisolone PO 1-2 mg/kg od for 3 days
  - If available: nebulizer with adrenaline (0.5 mL/kg of 1 : 1000 solution up to 5 mL; may be repeated every hour if needed; important: careful monitoring)
  - If no improvement admit to hospital for oxygen, observation, intensive treatment

## ACUTE EPIGLOTTITIS

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### Cause

- mostly: Haemophilus influenzae

### Symptoms

- Sudden onset
  - High fever
  - Severe respiratory symptoms (dyspnoea, chest-wall retractions)
  - difficulty in speaking
  - Child sitting up, drooling saliva

### Therapy

Do not try to examine the throat.

- Keep child in upright position.
  - Humidified oxygen if feasible
  - Admit to hospital straight away for treatment with antibiotics.
  - Intubation or tracheotomy will be needed in incipient airway obstruction.
  - If admission is not possible give antibiotics e.g. chloramphenicol 100 mg/kg IM in 3 divided doses.
- If airway obstruction and help not readily available coniotomy can be life saving.

Coniotomy:

Only to be done in dire emergencies!

- Take maximal large-bore cannula connected to 5 mL syringe.
- Insert at right angle to trachea between the two cartilages (thyroid and cricoid cartilage)
- Aspirate air, withdraw the needle and oxygenize/ventilate (small volumes, high frequency).

Or (in bigger children and with a little more time):

- After infiltration with lignocaine 1% cut skin below larynx
- 1.5-2 cm lengthwise.
- Cut horizontally across the cricothyroid ligament.
- Insert shortened gastric tube, suction tube or catheter.

## ACUTE TONSILLITIS

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 Description

Putride inflammation of the adenoid tonsils, usually bilateral



Concerned persons

Most frequent under the age of 9



Epidemiology

Worldwide



Cause

- Mainly streptococci
- 1-2% viruses (e.g. Epstein-Barr)
- Spread by droplet infection

## Symptoms

- Sore throat
- Dysphagia
- Earache, headache
- Pyrexia (often  $>39^{\circ}\text{C}$ )
- Tonsils enlarged, inflamed, occasionally with exsudate
- Tender cervical lymph glands
- Complications:
  - peritonsillar abscess (quinsy)
  - Acute nephritis, rheumatic fever as a late complication of Strep A

## Treatment

- Paracetamol or aspirin (adults) for pain and pyrexia
- Penicillin V:
  - Children: 30-60 mg/kg in 3-4 divided doses
  - Adults: 750 to 1000 mg tid
- Erythromycin (for patients with penicillin-allergy):
  - Children: 50 mg/kg in 3 divided doses
  - Adults: 750 to 1000 mg tid
- Treat for 7 days (= according to AWMF-guidelines)
- Salt water gargles (1 teaspoon of salt in 1 glass of warm water)

## OBSTRUCTIVE AIRWAYS DISEASE (BRONCHIAL ASTHMA AND COPD)

The two major (sometimes overlapping) forms of obstructive Airway disease are Asthma and COPD. They respond differently to medication.



Differential diagnosis of Bronchial Asthma versus COPD:

	<b>Bronchial Asthma</b>	<b>COPD</b>
<b>Age of first diagnosis</b>	Onset in early life (often childhood)	Onset in midlife or the elderly
<b>Cause</b>	Hyperresponsiveness of airways to different triggers (usually not by smoking)	Exposure to tobacco smoke, fumes
<b>Symptoms</b>	Recurrent attacks; symptoms often at night or early morning	Permanent dyspnoea on exertion
<b>Allergy</b>	Often trigger factor; often allergies, rhinitis and/or eczema may be present	Rarely trigger factor
<b>Airways Obstruction</b>	Recurrent attacks; fully reversible	Progression of obstruction, not fully reversible
<b>Medication</b>	Responding to inhaled corticosteroids	Only occasionally responding to inhaled corticosteroids

It is of utmost importance that every patient with the diagnosis of asthma or COPD is referred to an asthma clinic (if available in the projects). The diagnosis must be written clearly on the patient chart.

## BRONCHIAL ASTHMA



Description

- Chronic inflammatory disorder of the airways with intermittent airway obstruction due to bronchospasm, swelling of mucous membranes and hypersecretion of mucus
- Triggered by certain allergens (e.g. furred animals, cockroach allergens, domestic mites, pollens, yeast, fungi), respiratory tract infections, exercise, cold air, smoke or others
- Often other members of the family with asthma or atopic eczema



Symptoms

- Intermittent wheezing, tightness, dyspnoea
  - Recurrent cough (esp. in children, after exercise)
  - Nocturnal symptoms (cough, wheeze)
  - Severe attacks: chest-wall retractions (smaller children), severe dyspnoea, cyanosis,

- silent chest on auscultation
- hyperinflation of the chest
- Normal respiration in-between the attacks
- Often connected with atopic eczema

### Diagnosis

In our projects only testing of peak expiratory flow available to observe the variability of airflow limitation; for children > 5 years and adults

- Measurements should ideally be taken with same peak flow meter, preferably with the patient's own peak flow meter, always taking the best of 3 readings.
- Diagnosis should be based on patient's previous best peak flow (fully treated or asymptomatic), or of predicted value for age and sex.
- Diurnal variability > 20% (10% with twice daily readings - PEFr usually better in the evenings than in the mornings) of peak flow measurements  $\{(maximum - minimum\ PEFr) / maximum\ PEF \times 100\ (\%) \}$  or improvement of 60 l/min (or
- ? 20% of pre-bronchodilator PEF) after inhalation of a bronchodilator is suggestive of asthma.
- Poorly controlled asthma: PEFr < 60% of predicted or personal best; diurnal variability often poor

Chest x-ray: seldom diagnostic but useful in excluding pulmonary tuberculosis or cardiac failure

### Levels of asthma control (GINA 2019)

	<b>Controlled</b> <b>(all of the following)</b>	<b>Partly controlled</b>	<b>Uncontrolled</b>
<b>Limitations of activities</b>	None (twice or less/week)	More than twice/week	Three or more features of partly controlled asthma present in any week
<b>Cause</b>	None	Any	
<b>Nocturnal symptoms/awakenings</b>	None	Any	
<b>Need for reliever</b>	None (twice or less/week)	More than twice/week	
<b>Lung function (PEFR)</b>	Normal	< 80% of predicted or personal best (if known)	
<b>Assessment of future risk (risk of exacerbation, instability, rapid decline in lung function, side effects)</b>			

**Severity of Asthma exacerbations (GINA 2019):**

<b>Parameter</b>	<b>Mild</b>	<b>Moderate</b>	<b>Severe</b>
<b>Breathless</b>	Walking Can lie down	Walking slowly Infant: difficulty feeding Prefers sitting	At rest Hunched forward
<b>Talks in</b>	Sentences	Phrases	Words
<b>Alertness</b>	May be agitated	Usually agitated	Usually agitated
<b>Respiratory rate</b>	Increased	Increased	Often > 30/min
<b>Wheeze</b>	Moderate,	Loud	Usually loud
<b>Pulse/min</b>	< 100	100-120	> 120
<b>PEFR</b>	> 80%	60-80%	< 60% predicted or personal best (< 100 l/min adults) or response lasts < 2 hrs
<b>After initial bronchodilator % of personal best</b>			

**Normal respiratory rate in awake children:**

< 2 months	< 60/min
2-11 months	< 50/min
2-11 months	< 40/min
6-8 years	< 30/min

**Normal pulse rate in children:**

2-12 months	< 160/min
12 years	< 120/min
2-8 years	< 110/min

- Respiratory arrest imminent:
  - Patient drowsy or confused
  - Absence of wheeze
  - Bradycardia
  - Paradoxical thoraco-abdominal movement
  - reduced SPO<sub>2</sub>

**Differential Diagnosis**

- Helminths (?history)
  - Pulmonary tuberculosis (history of haemoptysis, anorexia, night sweats)
  - Gastrooesophageal reflux (?burning retrosternal pain)
  - Aspiration of foreign body (?sudden onset)
  - Congestive cardiac failure (?ankle oedema)

- Vocal cord dysfunction
- Hyperventilation, panic attacks

## Therapy

- Adjust treatment to best possible control.
  - If not controlled, consider stepping up to gain control.
  - Exacerbation: treat as such.
  - Reduction of treatment can be attempted after control has been maintained for at least 3 months.
  - Reliever medication: Salbutamol MDI prn (after teaching and with good technique of patient; young children: best given with spacer e.g. plastic cup or plastic bottle with hole in the bottom for inhaler)
- Step 1:
  - » Salbutamol metered dose inhaler (MDI): 1-2 puffs as required or
  - » Salbutamol PO:
    - » Children 2-6 years: 0.3-0.6 mg/kg in 3 divided doses prn (max. 4 mg tid)
    - » Children 6 -12 years: 2 mg prn up to qid
    - » Children > 12 years, adults: 2-4 mg prn up to qid
  - » Terbutaline suspension PO: children: 0.2 mg/kg in 3 divided doses prn. This drug is not available in all our projects.
  - » Problems with metered dose inhalers: compliance of patients (more difficult to use – always make sure that patient knows how to use the device!), more expensive than oral medication
- Step 2:
  - » add inhaled steroids if available; advantage: fewer side effects than oral medication) e.g.:
  - » Beclomethasone metered dose inhaler (MDI):
    - » Adults: 200 mcg bid
    - » Children: 50-100 mcg bid
  - » If not available give salbutamol tablets PO:
    - » Children 2-6 years: 0.3-0.6 mg/kg in 3 divided doses (max. 4 mg tid)
    - » Children 6 -12 years: 2 mg tid-qid
    - » Children > 12 years, adults: 2-4 mg tid-qid
    - » Terbutaline suspension: children 0.2 mg/kg in 3 divided doses. This drug is not available in all our projects.
- Step 3:
  - » Increase inhaled steroids:
  - » Beclomethasone MDI:

- » Adults: 400 mcg bid
- » Children: 100-200 mcg bid
- » With oral medication: add
  - » Aminophylline / Theophylline:
    - » Adults: 100-200 mg tid (10 mg/kg/day); avoid in children
- Step 4:
  - » With inhaled steroids add:
    - » Aminophylline / Theophylline PO:
      - » Adults: 100-200mg tid (10 mg/kg/day); avoid in children
  - » Otherwise add:
    - » Prednisolone PO:
      - » Adults: lowest possible dose to control symptoms e.g.
        - » 5 mg od in the morning
      - » Children: 1 mg/kg OD in the morning
      - » Reduce to lowest possible dose.
      - » Exclude tuberculosis before starting the patient on long term steroid treatment.

#### Acute attack (emergency)

- Salbutamol:
  - Inhaler (as effective as nebuliser):
    - » Start with 2-4 puffs every 20 minutes for the first hour.
    - » Then:
      - » Mild exacerbations: 24 puffs every 3-4 hours
      - » Moderate exacerbations: 6-10 puffs every 1-2 hours
      - » Best given with spacer e.g. plastic cup or plastic bottle with hole in the bottom for inhaler.
  - Salbutamol via nebuliser (if available):
    - » Start with:
      - » Children < 5 years: 2.5 mg every 20 minutes for the first hour
      - » Children > 5 years, adults: 2.5-5 mg every 20 minutes for the first hour
    - » Then repeat according to response (max. 40 mg daily).
- Glucocorticosteroids:
  - » Prednisolone PO:
    - » Children: 1 mg/kg for 5 days, then stop if possible.
    - » Adults: 40 mg for 7 days, then stop if possible or
  - » Hydrocortisone IV:

- » Adults: 2 mg/kg
- » Children: 4-8 mg/kg stat, then 2 mg/kg
- » Can be given up to qid prn.
- » Change to oral medication as soon as possible
- If available give oxygen for severe exacerbation.
- Consider Aminophylline:
  - » Adults: 1 vial 250 mg slowly IV or PO in ½ glass of water every 8 hours (as effective as IV medication)
  - » Avoid in children, esp. < 2 years (danger of convulsions) unless in hospital under supervision.
  - » Avoid if patient is already taking Aminophylline / Theophylline on a daily basis.
  - » Treat underlying bacterial superinfection.
- Monitor patient closely (symptoms and peak flow if possible).
  - Titrate medication to response of patient.
  - Ideal response: peak flow > 80% of predicted or personal best (response lasting > 3 hours)
- Refer to hospital:
  - No longer-lasting response to bronchodilator
    - » No improvement after oral glucocorticoid treatment within 2-6 hours
  - Patients with suspected hypoventilation, exhaustion, distress or peak flow 30-50% of predicted or personal best
- Review treatment and give action plan to patient.
- Refer to asthma clinic as soon as possible for further assessment if possible

## CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

---

### Description

- Productive cough more than three months in at least 2 consecutive years (WHO).
- Often under-recognized and under-diagnosed
- One of the leading causes of death worldwide
- Risk factors: tobacco smoke, occupational dusts and chemicals (intense or prolonged exposure), air pollution e.g. from biomass fuel used for cooking and heating in poorly ventilated dwellings (especially women affected)
- Chronic progressive, mostly irreversible disease of bronchi and terminal alveoli

### Symptoms

- Chronic cough
  - Chronic sputum production

- Dyspnoea on exertion, getting progressively worse
- Tachypnoea, wheeze
- With progression of disease: signs of left and right ventricular failure (with ankle oedema, increase of jugular pressure), respiratory failure

### Diagnosis

- Spirometry (decrease in FEV1 and FEV1 /FVC)
  - Problem in our projects: only peak flow measurement possible at present (COPD: poor diurnal variability)
  - Peak flow measurements: poor diurnal variability and little improvement after inhaled bronchodilator despite symptoms
  - Chest x-ray: seldom diagnostic but useful in excluding pulmonary tuberculosis or cardiac failure

### Therapy

- Intermittent or worsening symptoms:
  - Salbutamol metered dose inhaler (MDI): 1-2 puffs as required or (if problems with compliance or inhalation technique):
  - Salbutamol PO: adults: 2-4 mg prn up to qid
- Persistent symptoms:
  - Salbutamol tablets PO: adults: 2-4 mg tid-qid
    - » Long acting  $\beta$ -agonists not available in our projects (too expensive)
- Ongoing symptoms: add:
  - Aminophylline / Theophylline: adults 100-200 mg tid (10 mg/kg/day)
- Repeated exacerbations: try (under supervision of an asthma clinic):
  - Beclomethasone metered dose inhaler (MDI): adults: 200 mcg bid
  - Trial period for 3 months – if no improvement or poor inhalation technique: stop.
  - But be aware that the rather costly IHCS should preferably be given to asthma patients, in whom the benefit is more significant.
  - Acute exacerbation:
    - Prednisolone 30-40 mg PO for 7-10 days, then stop; long term treatment with oral steroids not recommended (no benefit, too many side effects).
- Treat underlying infection with antibiotics e.g. Amoxicillin 500 mg tid for 7 days.
- Refer to hospital with severe exacerbation.
- Counsel smokers about necessity to stop smoking.

### Important to remember:

- Staff should give demonstrations and – if available illustrated – instructions to every

patient with asthma or COPD attending the asthma clinic.

- Doctor should check inhalation technique of every patient treated with an inhaler before continuing the prescription. Refer patients with poor inhalation technique to asthma clinic as soon as possible or stop inhaler and give oral medication (easier to take and therefore more effective than an inhaler not used appropriately).

## OTITIS EXTERNA

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### Description

Diffuse inflammation of the skin in the external ear canal

### Cause

- Bacterial infection (e.g. staphylococci or pseudomonas)
- Fungal infection (e.g. candida albicans)
- Maceration or trauma of the ear canal
- Occasionally: foreign body

### Symptoms

- Irritation, often swollen external ear canal
- Discharge ("runny ear") clear or purulent (or none)
- Pain on moving the pinna or compression of the tragus
- Deafness
- Tympanic membrane intact (if visible)
- May be itchy if fungal infection

### Treatment:

- Aural toilet:
  - Flush external ear canal gently with normal saline.
  - Mop ear dry from the outside.
  - Wait for 10 minutes before applying ear drops.
- Chloramphenicol 0.5% ear drops: 2 drops tid or
- Gentamycin 0.5% ear drops: 2 drops tid
- Eye drops may be used if ear drops are unavailable
- Duration of treatment: 5-7 days

### Prevention

Avoid irritation of ear canal with cotton buds

## OTITIS MEDIA

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### Description:

- Acute inflammation of the middle ear
- Acute otitis often combined with common cold, sinusitis



### Concerned persons

- Common disease in early childhood, rare in adults
- Often chronic in older children, esp. with impaired resistance e.g. through malnutrition or measles (chronic suppurative otitis media)



### Cause

- Bacteria e.g. pneumococci, streptococci, haemophilus influenza, moraxella catarrhalis, sometimes pseudomonas-superinfection
- Viruses



### Symptoms

- Acute:
  - Pain, often pyrexia, sometimes discharge
  - Hearing impairment
  - Inspection: dull ear drum, bulging; purple colour; sometimes perforation of ear drum with discharge
- Chronic:
  - Perforated ear drum
  - Smelly discharge ("runny ear")
  - Complications: cholesteatoma, mastoiditis, labyrinthitis, meningitis deafness etc.



### Treatment

- Acute otitis media:
  - Paracetamol for pain and pyrexia
  - No ear irrigation!
  - Improve nasal ventilation with saline nose drops (or xylometazoline, where available)
  - If children/pat. >2yrs, fever <39°, no malnourishment, no severe pain, no ear drum perforation and if patient can be reviewed within 2 or 3 days, avoid antibiotics: spontaneous resolution is probable
  - Antibiotic treatment e.g.:
    - » Amoxicillin:

- » Children: high dose of 80 mg/kg in 3 divided doses
- » Adults: 750 -1000 mg tid.
- » Duration of treatment: children < 2 years: 10 days; children > 2 years, adults: 5-7 days
- » Second line treatment: Amoxicillin/Clavulanic acid
- » If allergic to Penicillin give Azithromycin:
  - » Children: 10 mg/kg OD x3 days
  - » Adults: 500 mg OD 3d
  - » If Azithromycin not available, try Cotrimoxazol
- Paracetamol or Ibuprofen for pain and pyrexia
- Chronic suppurative otitis media:
  - Aural toilet 3 to 4 times/day:
    - » Flush external ear canal gently (!) with normal saline.
    - » Mop ear dry from the outside.
    - » Wait for 10 minutes before applying ear drops.
    - » Important: education of patient how to mop ear canal
  - Chloramphenicol ear drops tid or Gentamicin tid or (preferably) Ciprofloxacin ear drops bid 3 drops, if available
    - » Duration of treatment: 2 weeks minimum
    - » If ear discharge persists: consider pseudomonas effective AB and rule out ETB
  - Refer to hospital in case of complications e.g. mastoiditis (persistent pain, discharge, pyrexia, swelling and tenderness behind the ear), meningitis.

## PERTUSSIS (WHOOPIING COUGH)

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Concerned persons

Can occur at any age.



Epidemiology

Mortality rate 4% in infants <12 months (no protection from maternal antibodies), 1% in children 1 to 4 years



Cause

Causative agent:

- *Bordetella pertussis*, spread by droplets

## Symptoms

- Incubation period: 6-20 days
- Catarrhal phase with nasopharyngeal discharge and nonspecific cough for 1-2 weeks
- Whooping phase with paroxysmal cough (with subsequent vomiting) and tenacious sputum for 6-8 weeks
- Prolonged cough in about 50% of patients
- Infants less than 3 months may develop cough fits and apnoeic periods leading to cyanosis
- Infectious period from 2 days before onset of cough; for 3 weeks
- Complications:
  - Malnutrition due to loss of appetite and recurrent vomiting
  - Epistaxis, haemoptysis, subconjunctival haemorrhage
  - Bronchopneumonia
  - Encephalitis

## Therapy

Routinely hospitalize infants <3 months and severe cases (isolate, cohort).

- Antibiotics (children):
  - First line: Azithromycin 10mg/kg OD x 5 days.
  - Alternative: Erythromycin 50 mg/kg in 3 divided doses for 2 weeks or Co-Trim 20+4mg/kg bid x 14 days
- Best if given in the catarrhal phase: can shorten the infective period and can avoid complications e.g. pneumonia.
- Maintain good fluid intake and encourage good nutrition.

## Prevention

- Immunization (booster for adults needed after 10 years)
- Post-exposure prophylaxis for incompletely vaccinated infants < 6 months with the above mentioned antibiotics

## RHINITIS / SINUSITIS

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### Differential Diagnosis

- Children > 4 years, adults with yellow discharge, fever and headache: consider: sinusitis;
- if not responding to nose drops and Ibuprofen treat with antibiotics such as Amoxi-

cillin or Cotrimoxazole (or Doxycycline for adults)

- With pain over sinuses: always check for dental problems, e.g. abscess.

Unilateral purulent discharge in children: check for foreign body in the nostril.

### Treatment

- Use saline nose drops (0.9% NaCl) to liquify nasal secretions; for infants instill nose drops 10 minutes before feeding.
- Increase fluid intake.
- Advice regarding salt water douches (sniffing a little salt water into each nostril) and/or hot (salt) water steam inhalations tid.

## TUBERCULOSIS

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### Description

- Clinically, 85% of tuberculosis patients have pulmonary tuberculosis, 15% have extrapulmonary tuberculosis; in few patients, lungs and other organs are involved at same time.
- Problem: infected people with sputum-positive tuberculosis (usually adults) are a source of infection for their family and other bystanders (a sputum-positive patient statistically infects 10-14 other persons per year; [infection is not same as disease]).
- Often problems with diagnosis if cough is a frequent complaint, e.g. due to environmental pollution, smoking

### Causative agent:

- Mycobacterium tuberculosis

Transmission:

- Bacilli spread in droplets of sputum
- Transported via bloodstream or lymphatics to different organs in the body

### Concerned persons

- Prevalence differs from country to country.
- Typical disease of poverty with malnutrition, poor housing conditions, overcrowding
- About 95% occur in developing countries, often together with other diseases e.g. HIV, diabetes mellitus.

## Pulmonary tuberculosis

### Symptoms

- Cough (> 2 weeks, productive)
  - Sputum; haemoptysis less common
  - Chest pain
  - Low grade fever, night sweats
  - Loss of weight
  - Dyspnoea

### Diagnosis:

- Investigation to show or rule out tuberculosis have to be done in every patient with a history of cough of longer than 2 weeks.
  - Direct smear microscopy for acid fast bacilli (AFB, Ziehl-Nelsen staining; in children > 10 years and adults):
    - » First spot specimen when patient presents for the first time.
    - » Early morning specimen (give specimen container to the patient for a specimen next morning: all sputum collected in the first 2 hours)
    - » Second spot specimen when the patient returns with the early morning specimen
  - This schedule varies between different countries. In India, only two sputum-samples are required. Other countries might require three samples.
  - Chest x-ray (with strong suggestion of tuberculosis, even in sputum-negative patients):
    - » Enlarged hilar lymph glands
    - » Upper zone: patchy shadows with or without: cavitation, calcification, diffuse small nodular opacities
    - » Complications: pleural effusion (90% of pleural effusions in young people usually are caused by Tb), pneumothorax etc.

### Differential diagnosis:

- Pneumonia
  - Bronchial asthma/COPD
  - Whooping cough (pertussis)
  - bronchiectasis, lung abscess
  - Lung cancer

## Extrapulmonary tuberculosis



### Description

Common in people with low resistance e.g. due to AIDS, malnutrition, other concomitant diseases or alcohol abuse, but also without concomitant diseases Any organ of the body can be involved; mainly cervical lymph nodes, spine, other bones and joints, abdomen, brain

### Tuberculous lymphadenitis (70%):

- Lymph nodes swollen, non-tender
  - Mainly cervical lymph nodes affected
  - Abscess formation possible, occasionally with sinus formation
  - Diagnostic procedure:
    - » FNAC (fine-needle aspiration and cytology; Ziehl-Nelsen staining) if no improvement after a 10 days' trial of antibiotics (e.g. amoxicillin)
    - »

### Tuberculosis of the spine (Pott's disease, caries spine; 20%):

- Back pain
  - Collapse of vertebrae, leading to gibbus formation
  - Some patients: signs of spinal cord compression, paraplegia of affected limbs
  - Paravertebral, gluteal or inguinal abscesses (cold abscesses)
  - Osteomyelitis, chronic fistulas, non-healing wounds

### Tuberculosis of the joint (2%):

- Mainly affecting knees or ankles
  - Effusion, fistula formation, joint destruction

### Abdominal tuberculosis (2%):

- Peritoneal tuberculosis: ascites
  - Intestinal tuberculosis: chronic abdominal pain, partial bowel obstruction, occasionally acute abdomen

### Tuberculous meningitis (2%):

- Mainly in children
  - Progressive weakness, nausea, headache, vomiting
  - Low grade fever
  - Neck stiffness (developing slowly)
  - Somnolence, coma
  - With cerebral/intracranial tuberculosis: headaches, late onset epilepsy

 Diagnosis:

#### Tuberculosis of the spine:

- X-ray of affected bone
  - X-Ray of the underlying bone of any part of the body that shows chronic purulent secretion
  - FNAC of abscess with Ziehl-Neelsen staining

#### Tuberculous meningitis (2%):

- CSF examination (lymphocytosis, elevated protein)
  - Cerebral tuberculosis: CT-scan

#### Tuberculosis in children

 Concerned persons

Children under 5 years of age: greater risk than adults of developing tuberculosis after an infection.

Often associated with malnutrition, HIV, history of measles and whooping cough, poor nutritional status or contact with smear-positive pulmonary tuberculosis among family or friends

 Symptoms

- Often non-specific symptoms
  - Suggestive of tuberculosis:
    - » Cough longer than 2 weeks not responding to 10 days' course of antibiotics (e.g. amoxicillin or cotrimoxazole)
    - » Continuous or recurrent fever of unknown origin
    - » Failure to thrive, loss of weight or failure to gain weight
    - » Enlarged non-tender lymph nodes > 1 cm in neck, axilla or groins of unknown origin persisting longer than 4 weeks
    - » Gibbus of spine with or without paraplegia

 Diagnosis:

- Difficult to diagnose as younger children are not able to produce sputum
  - In children > 10 years: direct smear microscopy for acid fast bacilli (AFB, Ziehl-Neelsen staining) x 3
  - In younger children: chest x-ray (?persistent area of consolidation, miliary pattern of infiltrates, effusion)
  - Mantoux test with PPD (purified protein derivate):
    - » Read after 72 hours.

- » < 5 mm: negative
- » 5-10 mm: in children < 5 years: result may be due to earlier BCG immunization, therefore unreliable
- » > 10 mm: positive
- » Indicated only for small children who are not able to produce sputum
- » Often negative in patients with low resistance (AIDS, measles, malnutrition etc.)
- » Reading should be done by the same person to get reliable results.

## CONTRAINDICATIONS

### Problem:

- Lack of patient compliance as symptoms improve or because of side effects treatment is often stopped leading to the development of resistant strains.
  - More successful: DOTS (directly observed therapy short-course) where the course runs over 6 months and the drug intake is controlled by trained staff
- 2 phases for new patient:
  - Intensive phase: Isoniazid/Rifampicin/Pyrazinamide/Ethambutol or Streptomycin for 2-3 months
  - Continuation phase: Isoniazid/Rifampicin for 4-6 months (2-3 times/ week)
- Refer to the local tuberculosis program, but remember: ill-functioning programs are worse than no programs at all because of selection of resistant bacteria and longer infective phases (more than 2 years) with risk of infecting close contacts.
- Pregnancy:
  - Avoid Streptomycin.
  - No problem with Isoniazid, Rifampicin, Pyrazinamide and Ethambutol
- Important: contact tracing (esp. for children < 5 years of age) and treatment of infected people
- Remember to treat the concomitant diseases like Diabetes, HIV!

### Prevention:

- BCG immunization after birth
  - Information regarding cleanliness, hygiene, nutrition, the ways of Tb-transmission

## Tuberculosis and AIDS

### Description

The incidence of tuberculosis is increasing with the incidence of HIV infection  
 In Africa: one third of AIDS patients are infected with tuberculosis and 40% of patients with tuberculosis are HIV-positive

- Tuberculosis during the **early stage of HIV**:

- Usual clinical manifestations
- PPD/Mantoux test positive
- Chest x-ray: upper lobes affected, cavities
- Rarely adenopathy
- Extrapulmonary Tb in 10-15%
- Tuberculosis during the **late stage of HIV**:
  - PPD/Mantoux test negative
  - Chest x-ray: atypical, lesions in the lower and middle lobe, no cavities
  - Adenopathy common
  - Extrapulmonary Tb in more than 50%



### Therapy

Duration of treatment: 9 months (instead of 6 months)



### Prevention

BCG immunization: contraindicated in patients with full picture of HIV-infection (controversial guidelines regarding asymptomatic HIV-positive patients)

Important to remember:

- All patients with cough lasting longer than 2 weeks must have their sputum checked for acid-fast bacilli.
- Patients with extrapulmonary tuberculosis must be investigated for pulmonary tuberculosis (sputum AFB).
- Fine-needle aspiration should be done on all swollen lymph nodes if not responding to a 10 days' course of antibiotics.
- Always think of tuberculosis of spine or bones in patients with chronic effusion of joints, fistula formation or progressive destruction of a single large joint.
- Think of abdominal tuberculosis in patients with ascites of unknown origin.
- Treatment for tuberculosis should only be started and supervised by trained staff according to a National Tuberculosis Program.



## AMOEBIASIS

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### Epidemiology

- Worldwide distribution; mainly in countries with poor sanitation when human faeces are used as fertilizers

### Cause

- Entamoeba histolytic; faecal-oral parasitic infection, also acquired by swallowing cysts in contaminated water.

### Symptoms

- Diarrhoea without fever, with blood
- Mainly asymptomatic carriers of cysts (90%), but in 10% amoebae penetrate the mucous of colon and cause shigellosis-like symptoms
- Amoebic dysentery with slow onset; diarrhoea with blood and mucus; abdominal cramps and tenderness, lasting for several weeks
  - Occasionally fever. Attacks can recur for years.
- Amoebic liver abscess:
  - Most common form of extraintestinal manifestation
  - Pain and tenderness and possibly enlargement of liver
  - Intermittent fever with rigors and sweating
  - Cough with lung involvement
  - Dyspnoea with anaemia

### Diagnosis

- Amoebic dysentery: microscopic examination of stool smear (freshly passed specimen) for trophozoites, if available
- Amoebic liver abscess: ultrasound scan, FBC (leucocytosis, anaemia)

### Treatment

- Amoebic dysentery:
  - Rehydration
  - Treatment if amoebiasis proven or if a correct treatment for shigellosis failed:
  - Metronidazole:
    - » Children < 12 years: 15mg/kg PO tid
    - » Adults: 500 mg PO tid
    - » Duration of treatment: 5 days. Inform patient to avoid alcohol

- » iv: same dosage.
- No treatment necessary for asymptomatic patients (even for those with systs in stool)
- Amoebic liver abscess:
  - Treatment for 10 days sufficient
  - During treatment: abscess may first increase in size
  - Even with correct treatment: abscess can take up to 6 months to disappear.
  - Alternative: Tinidazol (if available):
    - » Children 50mg/kg OD x 5 days
    - » Adults 2g OD x 5 days

## CAMPYLOBACTER ENTEROCOLITIS

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### Concerned persons

- Most common under the age of 1 year



### Cause

- Campylobacter jejuni, transmitted faecal-oral, human-to-human, animal-to-human (e.g. from infected poultry); also acquired by ingestion of contaminated food, water



### Symptoms

- Diarrhoea with fever and blood
- Often watery, occasionally bloody diarrhoea, abdominal pain, vomiting
- Sometimes (f.e. in immuno-compromised patients) severe with fever
- May be followed by reactive arthritis or Guillain-Barré syndrome
- Usually self-limiting (2-7 days)



### Treatment

- Rehydration
- Antibiotics only in severe cases (worldwide resistance also due to use of macrolides and especially quinolones in the poultry industry).
  - Azithromycine
    - » Children: 20 mg/kg OD x 5 days
    - » Adults: 500 mg OD x 5 days
  - Second line treatment: Ciprofloxacin:
    - » Adults: 500 mg bid
    - » Children: 30-40 mg/kg in 2 divided doses; use only if benefit outweighs the risk (of cartilage damage)

## CHOLERA

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### Epidemiology

- Usually panepidemic; in areas with poor sanitation and hygiene

### Cause

- *Vibrio cholera*
- Transmission faecal-oral; acquired by ingestion of contaminated water or food

### Symptoms

- Diarrhoea without fever, without blood
- Incubation period 2 hours to 5 days
- Profuse watery stools with mucus (rice water stools) leading to severe dehydration
- Vomiting
- Death due to hypovolaemic shock and renal failure

### Treatment

- Treat if diagnosis is suspected.
- Rehydration as quickly and effectively as possible e.g. with Ringer's Lactate solution (see Dehydration, chapter 5.4.)
- Antibiotic resistance testing should be achieved in the beginning of an outbreak. If no data available:
  - Doxycycline is the antibiotic of choice:
    - » Adults only: 300 mg single dose
  - Cotrimoxazole and Ciprofloxacin can be an alternative
    - » Duration of treatment: 3 days

## GASTRITIS, REFLUX AND ULCERA

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### Description

lesions of mucous membrane of stomach and/or duodenum

### Concerned persons

mainly but not exclusively adults

### Epidemiology

worldwide

## Cause

- Helicobacter pylori: Important cause of gastric or duodenal ulcer
- Non-steroidal antiinflammatory drugs (NSAIDs)
- Autoimmune (Vit. B12 deficiency)
- Dyspepsia often functional (incl. nicotine or alcohol abuse, stress)

## Symptoms

- Epigastric pain, sometimes nausea, vomiting
  - Possible acute complications:
    - » Bleeding (history of haematemesis or melaena; tachycardia, hypotension)
    - » Perforation (severe pain, guarding)

## Diagnosis

In German Doctors' projects diagnostic procedures e.g. endoscopy is only **indicated in rare cases**; treatment should therefore be given when diagnosis is suspected.

## Differential diagnosis:

- In developing countries: intestinal parasites (giardia, lamblia, helminths)
- Think of hunger pains!
- Also: reflux oesophagitis, pancreatitis, diseases of liver, gallbladder or large bowel, myocardial infarction, achalasia

## Therapy

- Advice to avoid carbonated or extremely hot or extremely cold drinks, hot spicy food, alcohol, cigarettes, acetylsalicylic acid, NSAIDs
  - Antacids:
    - » Magnesium trisilicate qid prn (1-2 hours after meals and 1 hour before going to bed)
    - » Side effects: reduced absorption of other drugs; risk of accumulation with renal impairment
  - H<sub>2</sub> blocker:
    - » Ranitidine: adults: 150 mg bid or 300 mg nocte
    - » Omeprazol or Pantoprazol in the more severe cases

## Helicobacter pylori

In our projects eradication of Helicobacter pylori can only be considered in indigent patients with a diagnosis of bleeding, perforated or recurrent or with constantly recurrent gastritis.

- Problems in developing countries:
  - Few data exist about eradication and relapse rate.
  - Clarithromycin resistance is frequent
  - Diagnostic methods e.g. endoscopic biopsies for histology, serology or breath tests are not available in our setting.
- French triple therapy (for 7 days):
  - Amoxicillin 1 g bid plus
  - Clarithromycin 500 mg bid plus
  - Omeprazole 20 mg bid
- Modified Italian triple therapy (for 7 to 10 days):
  - Metronidazole 400 mg bid plus
  - Amoxicillin 1g bid plus
  - Omeprazole 20 mg bid

## GIARDIASIS

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### Cause

- *Giardia intestinalis* (*Giardia lamblia*)
- Faecal-oral transmission: infection acquired by swallowing cysts in contaminated water or food
- Human-to-human



### Symptoms

- Diarrhoea without fever, without blood
- Often: asymptomatic carrier state
- Diarrhoea, often for weeks, frothy, pale, offensive smelling;
- often with flatus. Nausea, abdominal cramps
- Weight loss, often with malabsorption
- Failure to thrive in young children
- Secondary lactase deficiency



### Diagnosis

Microscopic examination (if available):

- Cysts in stool smear
- Trophozoites in freshly passed specimen

## Treatment

- Rehydration
- Metronidazole:
  - Children < 12 years: 30 mg/kg OD or in 3 divided doses, 3 days
  - Adults: 800 mg bid or 2g OD for 3 days
  - Inform patients to avoid alcohol.
- Tinidazole, if available (infection with resistant parasites):
  - Advantage: longer half-life, short duration of treatment
  - Children > 6 years: 50mg/kg SD
  - Adults: 2 g SD

## SALMONELLA ENTERITIS

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### Cause

- Salmonella species; transmission faecal-oral or by contaminated food

### Symptoms

- Diarrhoea with fever, without blood
- Incubation period 12-48 hours
- Fever, headache, vomiting, later abdominal cramps
- Diarrhoea first watery, later with blood and/ or mucus
- Diagnosis: Isolation of bacteria from stool (usually not available)
- Complications:
  - Generalized bacteraemia with typhoid-like symptoms
  - Reactive arthropathy; Iridocyclitis

### Treatment

- Rehydration
- Usually self-limiting
- Antibiotic therapy (often resistance to Amoxicillin, Cotrim, Chloramphenicol) use only in severe cases (b/o resistant organisms and risk of prolonging the intestinal carriage of salmonella).
  - Ciprofloxacin:
    - » Adults: 500 mg bid, 5 days
    - » Children: 30-40 mg/kg in 2 divided doses; use if benefit outweighs the risk (of cartilage damage)
  - or Ceftriaxon parental route, if available

## SHIGELLOSIS

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### Concerned Persons

- Very common in children <5 years. Highly contagious.



### Epidemiology

- Endemic in most developing countries



### Cause

- Most common cause (far more than salmonellae or amoebae) of bloody diarrhoea worldwide
- Causative agents: mainly shigella dysenteriae, shigella flexneri
- Transmission: Person-to-person or acquired by ingestion of contaminated water or food



### Symptoms

- Diarrhoea with fever and blood
- Acute onset: fever (common), malaise. Fever not in all cases.
- Abdominal cramps. Bloody mucoid diarrhoea, anorexia.
- Complications:
  - Dehydration, low sodium, low blood glucose
  - Convulsions
  - Perforation of bowel
  - Haemolytic uraemic syndrome



### Treatment

- Rehydration
- World-wide resistance to antibiotics: use only in severe cases.
- Treatment should ideally be based on susceptibility data from shigella strains isolated in the area.
- If strain is sensitive, use ciprofloxacin:
  - Adults: 500 mg bid
  - Children: 30-40 mg/kg in 2 divided doses; although there is a risk of cartilage damage, use it if benefit outweighs risk.
  - Duration of treatment: 5 days
  - Alternative: Ceftriaxone i.m. for 3 days
- If no improvement or contraindication:
  - Azithromycin for 5 days (day 1: children 12mg/kg, adults 500mg; days 2-5:

- children 6mg/kg, adults 250mg/day)
- or Cefixime for 5 days (children 8mg/kg OD, adults 400mg OD)
- Supportive (for pain, fever):
  - Hyoscine butylbromide and Paracetamol
- In an epidemic context: exclude infected children from school.

## TRAVELLER'S DIARRHOEA

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### Cause

- Enterotoxigenic E. coli (ETEC); transmission faecal-oral
- Infection acquired by ingestion of contaminated food or water
- conferring longer lasting immunity (therefore visitors are more susceptible than residents)



### Symptoms

- Diarrhoea without fever, without blood
- Self limiting
- Watery diarrhoea, vomiting, anorexia
- Dehydration in malnourished children



### Treatment

- Fluid replacement
- Antibiotics seldom necessary. Resistance widespread
  - For severe illness: Ciprofloxacin 500 mg bid for 1-5 days

## CHRONIC ULCERS

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Chronic ulcers are wounds of the lower leg, not closing in the regular healing time with infected soft-tissue defects, sometimes in combination with osteomyelitis. It often is a severe, sometimes even septic clinical presentation with serious consequences for the patient concerning his social and economic status.

Every patient with lower leg ulcer needs a diagnostic and treatment-follow-up with written documentation, which has to be started at first contact and will stay in the medical records. If a surgeon or long-term-doctor is part of the team, it would be good to involve them.

## FUNGAL INFECTIONS

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### Description

Tinea corporis: Gyrate, scaling, erythematous, itchy lesions. Endemic in areas with hot and humid climate, esp. in crowded and dirty living conditions and close contact with animals.

Pityriasis versicolor: Brown or white, slightly scaly, aphlogistic lesions on adults trunks. Very common in the tropics.

Candidosis: Whitish thrush or pustules on erythematous skin and mucous membranes

Subcutaneous Mykoses: Chronic granulomatous processes



### Cause

Tinea corporis: Dermatophytes (living in stratum corneum of skin invading horn of hair roots of body and scalp)

Candidiasis: Mainly candida albicans

Pityriasis versicolor: Pityrosporon ovale (malassezia furfur)



### Symptoms

Tinea:

- Tinea pedis (athlete's foot), tinea manuum:
  - Itching, scaling, maceration, fissures between toes, fingers
  - Spreading to soles of foot or palms of hand
  - Occasionally hyperkeratotic lesions, sometimes only scaling of palm
- Tinea corporis:
  - Can affect groin, body and head
  - Round scaly areas with elevated papular border, initially erythematous, later often hyperpigmented
  - Occasionally pustules
  - Lesions may merge producing larger areas.

- Tinea capitis:
  - Round scaly area, erythematous, with papules, inflammation; occasionally folliculitis
  - If treated late permanent alopecia (due to scars) may develop.

#### Candidiasis:

- Oropharyngeal:
  - White plaques on inflamed mucosa of mouth
- Vaginal:
  - White creamy discharge, inflamed mucosa, pruritus
- Cutaneous:
  - Red rash, wet, with papules or pustules
  - On perineum (e.g. nappy rash in babies) or in skin folds
  - White soggy-looking skin in interdigital space
- Severe widespread infections (also systemic) in immunocompromised patients, e.g. patients infected with HIV

#### Pityriasis versicolor:

- Hypo- or hyperpigmented macules, irregularly shaped, with scales
- On trunk, esp. back, upper arms, neck



#### Differential Diagnosis

#### Tinea corporis:

- Microbial eczema
- Psoriasis
- Traumatic or psoriatic onychodystrophy
- Pyogenic folliculitis capitis

#### Pityriasis versicolor:

- Pityriasis alba
  - Eczema, mainly in children (face), but also adults
  - Different areas of the body affected, esp. arms and legs
  - With white, well demarcated areas
  - Occasionally slight pruritus
  - Self-limiting; no treatment necessary
- Leukoderma
- Vitiligo

- persistent hypopigmented macules
- Leprosy
  - single or few macules with diminished sensitivity for touch, temperature and pain

#### Candidosis:

- Pyoderma,
- eczema,
- Intertriginous Psoriasis

#### Subcutaneous mycoses:

- Chronic mycobacterial infections,
- chronic pyoderma



#### Therapy

Clotrimazole cream

Fluconazol 50mg/day for at least 4 weeks until no more scaling can be seen

Griseofulvin 10mg/kg body weight

#### Tinea:

- Body and clothes should be washed daily.
- Local treatment only effective in hairless areas like palms and soles; otherwise additional systemic treatment necessary
- Tinea pedis, manuum:
  - Gentian violet solution 0.5% bid-tid
  - Clotrimazole cream 1% bid-tid
  - Duration of treatment: at least 3 weeks
- Tinea with hyperkeratosis on hand or feet, tinea corporis:
  - Griseofulvin:
    - » Children: 10 mg/kg in 2 divided doses
    - » Adults: 500-750 mg od
    - » Duration of treatment: 4 weeks
  - Fluconazole:
    - » Adults: 50 mg od
    - » Duration of treatment: 4-6 weeks
    - » Avoid in children.
- Tinea capitis:
  - Remove hair next to affected scalp areas.

- Treat with griseofulvin or Fluconazole according to availability.
- Onychomycosis:
  - Doubtful outcome even after several months treatment with fluconazole or Griseofulvin.

#### Candidiasis:

- Skin should be cleaned on a daily base.
- Oropharyngeal thrush and nappy rash:
  - Nystatin suspension or gel qid
  - Gentian violet solution 0.5% bid-tid
  - Duration of treatment: 1 week
- Vaginal thrush:
  - Clotrimazole 500 mg vaginal tablet single dose or 200 mg on 3 consecutive nights
  - Treat sexual partner, advise condoms during treatment.
- Cutaneous thrush:
  - Gentian violet solution 0.5% bid-tid
  - Clotrimazole cream 1% bid-tid
  - Duration of treatment: up to 1 week after the disappearing of lesions (at least 3 weeks)
- Widespread lesions esp. in immunocompromised patients e.g. patients with HIV:
  - Fluconazole 50 mg od
  - Duration of treatment: 2-4 weeks
- Synthetics should be avoided; in nappy rash: expose bottom of child to air as much as possible.

#### Pityriasis versicolor:

- Clotrimazole 1% cream bid-tid
- Generalized Pityriasis versicolor in adults: Fluconazole 50mg od for 4 weeks. Ketoconazole shampoo (needs to be bought by pat.) 3 times a week afterwards. Patient should produce foam out of the shampoo. Spread the foam all over the body. Leave it for 20 min and wash it off afterwards.
- Duration of treatment: at least 3 weeks

## LEPROSY

---

### Cause

#### Causative agent:

- *Mycobacterium leprae* (Hansen bacillus); most cases in S- and SE-Asia

#### Transmission:

- Human-to-human (probably droplet infection or infection from ulcers)

### Symptoms

- A chronic infection, initially often asymptomatic, occasionally resolving spontaneously.
- Two different main forms:
  - Lepromatous leprosy (people with low resistance, widespread bacillary infiltration):
    - Diffuse infiltration with thickening of skin; maculo-papular lesions, can be hypopigmented or erythematous
    - Nerve thickening leading to sensory and motor dysfunction with paraesthesia, hyperaesthesia, hyperalgesia, also muscle wasting leading to paralysis
    - Nasal and/or ear infiltration with discharge and ulceration (facies leonica)
    - Infiltration of eyes (iritis, corneal changes leading to blindness), testes (atrophy), lymph nodes (swelling, ulceration)
  - Tuberculoid leprosy (people with good resistance, few bacilli, localized):
    - Skin: few lesions (macules), more often hypopigmented than red, sharply demarcated, with sensory loss; destruction of hair follicles
    - Nerve thickening with early sensory loss; palpable thickening e.g. of ulnar, median or peroneal nerve; asymmetrical
- Several intermediate stages exist between these two polarities of the disease

### Diagnosis

- L. should be considered in every pat. with palpable thickening of nerves (e.g. sulcus of elbow) & sensory loss
- Infiltrated pigmented nodules on face, ear lobes, limbs
- Slit-scrape smear of skin
- Lepromin test (for classification and prognostic purposes; negative in lepromatous leprosy)

### Therapy

- To consider Leprosy (a.k.a. "Hansen's disease") in suspect cases is essential!
- Refer to hospital or local treatment program.

## NEURODERMITIS

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### Description

Genetically transmitted disease complex. Skin of affected persons is dry and sensitive against irritants. This group of individuals tends to develop atopic dermatitis, hay fever and asthma. Atopic dermatitis happens with a various number of outbreaks, especially in the young. About 20% of the affected youngsters continue to have atopic dermatitis in adulthood.

### Allergic contact dermatitis

- Caused by allergens e.g. perfumes, metals, chemicals, food or plants, rove or blister beetles (Nairobi eye)

### Irritant contact dermatitis

- Exposure to irritants e.g. water, heat, chemical substances, cement, tar
- Affects men working without personal protective equipment or women with long-term exposure to water and manual work (laundry, cooking)

### Atopic eczema

- Hereditary condition
- Often combined with allergic asthma or hayfever or allergy to certain food e.g. vegetables, herbs, fruit, nuts etc.
- Exacerbations often brought on by stress, illness etc.

### Epidemiology

Very common genetic condition in Africa and Asia.

### Symptoms

Itchy dermatitis either with flexural accentuation or follicular type or discoid (microbial) type

### Irritant contact dermatitis

- Acute:
  - Redness, vesicles, blisters, pustules (with infection)
- Chronic:
  - Papules, lichenification, scaling
  - Painful fissures
  - Thickening of skin

### Atopic eczema

- Babies:

- Hyperkeratotic plaques on head (cradle cap)
- Smaller children:
  - Eczema with redness and tiny blisters
  - Often on cheeks and ears
- Older children:
  - Hyperkeratotic plaques and papules (lichenification), erosions, crusts, fissures
  - Mainly in flexures of knees and elbows, sides of neck, arms, hand, feet
- Adults:
  - Mainly isolated patches of eczema, esp. on lower legs and forefeet with pruritus, hyperpigmentation and lichenification (lichen simplex chronicus)
- Severe itch; secondary infection possible



### Diagnosis

Recurrent dermatitis with preferably symmetric lesions on soft flexural skin (eyelids, side of the neck, flexural side elbow, groin, behind the knees)



### Differential Diagnosis

- Psoriasis
- Scabies
- Tinea
- Pyoderma



### Therapy

Cortison ointments, antibiotics (Cefalosporin, Cloxacillin, Amoxicillin)

Disinfection of lesions with Povidon or Gentian violet before applying of the Cortison ointment.

Antihistaminic tablets

### Irritant contact dermatitis

- Eczema with redness:
  - Hydrocortisone 1% ointment, Betamethasone ointment tid to affected areas
- Superinfected eczema:
  - First Povidone Iodine solution 10% tid or Gentian violet solution 0.5% tid, then after drying of the paint Cortison ointment
- Sensitive skin:
  - Vaseline
- Advice to avoid exposure to sensitizing agents
- Advice regarding use of personal protective equipment or change of work if at all

possible

- Nairobi eye:
  - Compresses with mild antiseptic solutions (e.g. gentian violet 0.5%)
  - Steroids e.g. Prednisolone only in severe cases

### Atopic eczema

- Cold compresses to itchy lesions
- Exposure to sunlight can be beneficial.
- Dry lesions:
  - Betamethasone ointment or Hydrocortisone 1% ointment tid for several days
- For prevention of superinfection:
  - First Povidone solution or Gentian Violet. When paint is dry on top Hydrocortisone 1% cream at night.
- If pruritus:
  - Diphenhydramine:
    - » Children 1-2 mg/kg tid prn
    - » Adults: 50 mg tid prn
- Advice to cut children's finger nails short to stop them from scratching; in babies it might be necessary to cover their hands with gloves or socks

## PEDICULOSIS (LOUSE INFESTATION)

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### Epidemiology

- World-wide; in areas with poor hygiene

### Cause

- Causative agents:
  - Pediculus humanus (body louse)
  - Pediculus capitis (head louse)
  - Phthirus pubis (crab louse)
- Life cycle:
  - Female louse attaches eggs firmly to body hair (close to the skin) or folds of clothing (P. humanus).
  - Nymphs hatch, develop into adult lice in about 3 weeks; both suck blood several times during the day.
- Transmission:
  - Close contact, clothes, bedding

## Symptoms

- Papular rash with itching
- Intense scratching leading to secondary infection
- *P. humanus* can transmit louse-borne typhus or relapsing fever.

Always remember: impetigo of the scalp or neck can be caused by infestation with head lice.

## Therapy

- Easiest solution is to shave head or affected areas; otherwise:
- Hair should be washed daily and combed with a fine comb.
- Benzyl benzoate 25% emulsion (diluted 1:3 with clean water):
  - Apply to affected areas (avoid contact with eyes).
  - Leave overnight, wash hair in the morning.
  - Apply on 3 consecutive days.
- Patient to check for nits: they may need to be removed with comb or fingers.
- Give antibiotics in severe infection.
- Clothes and bedding should be washed and boiled and left to dry in the sun.

## PYODERMIA

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### Description

Skin infection with mostly Staphylococci, less frequently Streptococci. Often superinfection of small wounds or allergic type dermatitis in atopy or scabies.

### Impetigo

- Highly contagious
- Often recurrent episodes
- Affects mainly children
- Complications e.g. renal involvement or rheumatoid arthritis more common in developing countries

### Abscess

- Caused by puncture wound or infected hair root
- Bacteria can spread after rupture of affected hair follicle or with blood stream leading to collection of pus in cutaneous and subcutaneous tissue

### Erysipelas/Cellulitis

- After minor trauma or other breaks in the skin

- Common site of entry for bacteria: interdigital space of feet after fungal infection; also insect bites
- Risk factors:
  - Immunodeficiency
  - Diabetes mellitus
  - Alcohol/drug abuse
  - Anaemia
  - Lymphoedema
  - Obesity
- Erysipelas: Infection spreads in dermis and upper subcutaneous tissues
- Cellulitis: Spreading infection in dermis and epidermis

### Epidemiology

Patients of all age groups in slum regions all over the world with low hygiene standards affected.

### Cause

#### Impetigo

Causative agents:

- Streptococci
- Staphylococci

#### Erysipelas

- Group A  $\beta$ -haemolytic Streptococci

#### Cellulitis

- Staphylococci
- Group A  $\beta$ -haemolytic Streptococci

### Symptoms

Pyoderma shows up in different forms:

- Blisters with yellow fluid or yellowish crusted erosions (Impetigo).
- Folliculitis.
- Painful fluctuating nodules with erythematous surface (Abscesses). Sometimes with fever.
- Painful, erythematous skin infiltrations and ulcerations, often with yellow crusts (cellulitis, in German medical language "Phlegmone"). Occasionally with fever.
- Sharply demarcated, red, sometimes blistering dermal infiltrates with fever and ma-

laise (Erysipelas).

### Impetigo

- Mainly small, occasionally large fragile blisters, later with pus; yellow crusts
- Often associated with skin damage
- Lesions located especially around the mouth.
- Complications:
  - Spread over body affecting hair roots esp. in face and on head causing boils and abscesses
  - Rheumatic fever or acute glomerulonephritis (if caused by strepto-cocci)
- If located on the head: exclude head lice.
- Slight itchiness rarely
- If mainly nocturnal itchiness all over the body and involvement of other family members: exclude scabies.

### Abscess

- Localized swelling, erythema, warmth, tenderness
- Later: fluctuance

### Erysipelas

- Mainly on face or legs
- Red, hot, oedematous tender area of skin; sharply demarcated
- Severe illness: vesicles, bullae, erosion
- Accompanying lymphangitis
- Fever and malaise
- With recurrent episodes: fewer symptoms: mild erythema, persistent oedema

### Cellulitis

- Often affected: lower legs
- Mainly localized symptoms
- Redness (less well demarcated), diffuse oedema, warmth, pain
- Occasionally lymphangitis with adenopathy
- Complications: abscess formation, purulent blisters, necrosis of soft tissue, rarely necrotizing fasciitis



### Diagnosis

- Pus filled blisters,

- Pustules, ulcers or erythemas with yellow crusts or visible pus.
- Painful erythematous infiltrates or nodules in dermis and subcutis.
- Pus filled abscesses.



#### Differential Diagnosis

- Allergic dermatitis
- Mycotic infections
- Mycobacterial infections
- Autoimmune reactions



#### Therapy

Antibiotics with bactericidal effects on Staphylococci and Streptococci. (first generation Cephalosporins, Amoxiclav, Amoxicillin+Cloxacillin, Clindamycin)

Draining of abscesses.

Locally disinfection with Povidon or gentian violet.

Dressings.

#### Impetigo

- Wash affected areas several times a day with warm water and soap.
- Gentian violet solution 0.5% or povidone iodine solution 10% to affected areas
- In extensive cases (3-4 lesions present, abscess, boils):
- Cloxacillin:
  - » Children: 50 mg/kg in 3-4 divided doses
  - » Adults: 500 mg qid
  - » Duration of treatment: 1 week
- Erythromycin:
  - » Children: 50 mg/kg in 3 divided doses
  - » Adults: 500 mg tid-qid
  - » Duration of treatment: 1 week
- Cefuroxime:
  - » Children: 30 mg/kg in 2 divided doses
  - » Adults: 250-500 mg bid
  - » Duration of treatment: 10 days
- Amoxiclav:
  - » Patients > 40 kg Amoxiclav 875 mg/125 mg bid
  - » Duration of treatment 14 days

- Advice to keep the affected child away from other children.
- Advice regarding cleanliness
- Treat underlying conditions e.g. headlice, scabies.

### Abscess

- Hot compresses repeatedly to affected area
- Ichthammol ointment 20% locally
- Larger fluctuant abscesses: incision and drainage
- Antibiotics in case of systemic infection e.g.
  - Erythromycin:
    - » Children: 50 mg/kg in 3 divided doses
    - » Adults: 500 mg qid
    - » Duration of treatment: 1 week
  - In severe cases:
    - » Cloxacillin:
      - » Children: 50 mg/kg in 3-4 divided doses
      - » Adults: 500-1000 mg qid
      - » Duration of treatment: 1 week
      - » To be taken on an empty stomach
  - **or if available**
    - » Cephalosporines e.g. cefuroxime:
      - » Children: 30 mg/kg in 2 divided doses
      - » Adults: 250-500 mg bid
      - » Duration of treatment: 10 days
    - » Amoxiclav:
      - » Patients > 40 kg Amoxiclav 875 mg/125 mg bid
      - » Duration of treatment 14 days

### Cellulitis

- Immobilize affected limb.
- Advice regarding cool compresses
- Antibiotics PO:
  - Cloxacillin:
    - » Children: 50 mg/kg in 3-4 divided doses
    - » Adults: 500-1000 mg qid
    - » To be taken on an empty stomach
    - » Duration of treatment: 1 week

- **or** Erythromycin:
  - » Children: 50 mg/kg in 3 divided doses
  - » Adults: 500 mg qid
  - » Duration of treatment: 1 week
- **or if available** Cephalosporines e.g. cefuroxime:
  - » Children: 30 mg/kg in 2 divided doses
  - » Adults: 250-500 mg bid
  - » Duration of treatment: 10 days
- **or if available** Amoxiclav:
  - » Patients > 40 kg Amoxiclav 875 mg/125 mg bid
  - » Duration of treatment 14 days
- Severe infections: admit to hospital for IV antibiotics and possible further intervention.
- With fungal infection of the foot: Clotrimazole ointment tid for 3-4 weeks
- Check for underlying diseases and treat accordingly.

## SCABIES

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### Description

Allergic dermatitis due to the presence of scabies mites in the skin.

### Epidemiology

- World-wide infection
- In areas without proper hygiene, with poverty and/or overcrowding

### Cause

#### Causative agent:

- *Sarcoptes scabiei*

#### Transmission:

- Direct skin contact person-to-person (female mite), through clothes and bedding

#### Life cycle:

- Female mite lays eggs in a burrow in the skin.
- Larvae hatch, moult, undergo several stages and mature into adults.
- After fertilization on the surface females start burrows again.
- Transmission can occur at any time after infection with mites.

## Symptoms

- Allergic type dermatitis
- burrows
- eventually pyoderma
- whole body itchiness at night more than during the day
- Incubation period: 6-8 weeks until appearance of rash
- Initially small itchy papules (burrows with eggs and secretion of mites)
- After sensitization of skin generalized rash with vesicles and nodules, esp. between fingers and toes, wrists, genitals, buttocks, arms and legs
- Itch severe at night
- Scratching often leads to secondary infection.

## Diagnosis

- Papular dermatitis, often superinfected, on the whole body
- Burrows especially interdigital, intertriginous and perigenital

## Differential Diagnosis

- Every other allergic type dermatitis
- in Africa papular urticaria and papular pruritic eruption of HIV

## Therapy

- All members of the household should be treated at the same time (even if asymptomatic).
- All clothes and bedding should be washed daily and dried in the sun.
- Advice to cut children's finger nails short to stop them from scratching; in babies it might be necessary to cover their hands with gloves or socks
- Benzyl benzoate 25% emulsion:
  - Adults, children > 10 years:
    - » After bath apply emulsion to whole body from neck downward (including area behind the ears).
  - Younger children:
    - » Dilute to half strength (12.5%).
    - » Include head in treatment.
  - Leave overnight and renew in the morning.
  - Treat for 3 consecutive days, then wash it off.
  - Treat whole family at the same time.
  - Treatment of large communities and problems with compliance: repeat treatment after 10 days.

- In superinfected scabies treat for scabies but give antibiotic at the same time:
  - Cloxacillin:
    - » Children: 50 mg/kg in 3-4 divided doses
    - » Adults: 500-1000 mg qid or
  - Cefuroxime:
    - » Children: 30 mg/kg in 2 divided doses
    - » Adults: 250-500 mg bid
- Topical treatment:
  - Gentian violet solution 0.5% and povidone iodine ointment/solution for pustules
- Often itch persists for several weeks (i.e. an allergic reaction to dead mites, not a treatment failure); if recurrence of papular itchy lesions: recurrence of illness likely
- Severe pruritus:
  - Diphenhydramine:
    - » Children: 1-2 mg tid prn
    - » Adults: 50 mg up to tid prn
- Ivermectin:
  - 0,2mg/kg KG
  - Perhaps treatment of choice in the future (advantage: tablets only, better compliance, less treatment failure), but too expensive at present
- Permethrin 5 % cream

## TROPICAL ULCER

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### Concerned persons

- Often in malnourished patients with low protein intake
- Occurs after minor trauma e.g. insect bite, cut or abrasion



### Cause

- Bacillus fusiformis, spirochaetes
- Mixed infections with other bacteria possible



### Symptoms

- Usually affecting ankle or lower leg
- Initially papule or blister; develops rapidly into an ulcer and destroys the surrounding tissue
- Occasionally exposes muscles or tendons
- Very painful in the beginning, pain decreases after about 4 weeks.

- Healing slowly, but often becomes stationary at 1-10 cm in size
- Painless in chronic state
- Complications:
  - Infection of underlying bone or tendon
  - Septicaemia
  - Tetanus
  - Occasionally superinfection with diphtheria, leading to a white membrane on ulcer



#### Differential Diagnosis

- Tuberculosis
- Leishmaniasis
- Ecthyma (ulcerative bacterial infection caused by streptococci or staphylococci)



#### Therapy

- Clean with povidone iodine solution or Ringer's Lactate solution.
- Daily dressings with povidone iodine ointment
- Acute stage:
  - Penicillin V:
    - » Children: 30 mg/kg in 3-4 divided doses
    - » Adults: 500 mg qid
    - » Duration of treatment: 5-7 days
- If no improvement give:
- Erythromycin:
  - Children: 50 mg/kg in 3 divided doses
  - Adults: 500 mg qid
  - Duration of treatment: 7 days

or if available

- Cephalosporine e.g. Cefuroxime:
  - Children: 30 mg/kg in 2 divided doses
  - Adults: 250-500 mg bid
  - Duration of treatment: 10 days
- Tetanus prophylaxis
- Advice to wear shoes, if possible long trousers



## CATARACT

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### Description

Opacity of the lens, causing a progressive loss of visual activity

### Concerned persons

In tropical regions: occurring about 10 years earlier than in Western countries

### Epidemiology

Most common cause of blindness worldwide

### Cause

Risk factors: possibly associated with sunlight, malnutrition, diabetes mellitus, hypertension

### Symptoms

- White opacity in pupil
- Decreasing visual acuity
- Increased dazzling

### Treatment

- Surgery (only if both eyes are affected; eye camps in some of our projects e.g. in the Philippines, India, Sierra Leone)
- Normally glasses used for aphakic correction
- In some hospitals: intraocular lens implantat

#### **Note:**

An operation is important to avoid permanent blindness which leads to loss of income and additional burden to the family because the blind need to be looked after permanently by a member of the family.

## CONJUNCTIVITIS

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### Description

Acute inflammation of the conjunctivae due to infection, allergy or irritation



### Concerned persons

- All ages
- May be associated with measles or rhinopharyngitis in children
- also see Trachoma



### Epidemiology

worldwide



### Cause

- Bacteria, viruses, rarely fungi;
- Also: allergic in origin (often associated with hay fever)
- Visual acuity usually not affected



### Symptoms

- Bacterial conjunctivitis:
  - Red eye, irritation
  - Purulent discharge
  - Occasionally with chemosis
- Viral infection:
  - Red eye
  - Watery discharge
  - Occasionally complications like keratitis (severe pain, photophobia) or secondary bacterial infection, ulcers
- Allergic conjunctivitis:
  - Red eye
  - Severe pruritus
  - Watery discharge
  - Eyelid oedema
  - Often associated with other allergic diseases e.g. eczema or hay fever or asthma
- Ophthalmia neonatorum
- Trachoma

## Treatment

- Bacterial conjunctivitis:
  - antibiotic eye drops tid for 5-7 days
  - Tetracycline 1% ointment (for very watery eyes) tid for 5-7 days
  - With severe illness: treat for up to 14 days (esp. in neonates)
- Viral conjunctivitis:
  - Cold compresses
  - Antibiotic eye drops or ointment for secondary infection
- Allergic conjunctivitis:
  - Cold compresses
  - Severe illness: antihistamines p.o.
    - » Children: 2 mg/kg tid prn
    - » Adults: 50 mg tid prn

Eyes should be cleaned regularly with normal saline.

Do not pad an infected eye.

Advise to clean hands after application of eye drops/ointment.

Analgetics if needed.



## Prevention

Advise to avoid touching a non-infected eye after touching the infected eye

## PTERYGIUM

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## Description

Fibrovascular whitish tissue grows slowly from conjunctivae to the cornea



## Concerned persons

More often in males than in females, esp. those exposed to wind and dust



## Epidemiology

Very common in the tropics, dry areas > rainy areas



## Cause

Possibly due to high exposure to ultraviolet light and to dust and sand



## Symptoms

- Whitish or yellow, sometimes injected and mostly triangular veil on the surface of

parts of conjunctiva and cornea

- Growing across the cornea from temporal or nasal side, finally reaching the pupil
- Beginning slowly, but can grow rapidly.
- Possible: itching, irritation, visual disturbance



#### Differential Diagnosis

- Pinguecula:
  - Small asymptomatic nodules (often yellowish) on bulbar surface of conjunctiva
  - Not extending to cornea



#### Treatment:

- Normal saline drops for irritation or itching
- Operation before visual problems occur. But high recurrence rate

## TRACHOMA

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#### Description

A keratokonjunctivitis, classified into 5 stages, highly contagious



#### Concerned persons

- Disease of poverty, associated with poor hygiene, lack of water and overcrowding
- First infection mainly in children between 1 to 6 years; also affected: contacts e.g. mothers and older siblings



#### Epidemiology

- Most common eye disease in the world (500 million people infected)
- major cause of blindness, second only to cataract
- Endemic in dry and hot areas of Africa, India and South-East Asia



#### Cause

- Chlamydia trachomatis type A-C (the infection scars the eyelids, causing the eyelashes to turn in and scratch the cornea, causing ulceration and blindness)
- Risk factors (five D's): dry, dusty, dirty, density (overcrowding of homes), (eye-) discharge



#### Transmission:

- Flies, faeces, fingers, contaminated clothes (smear infection)

 Symptoms:

Usually both eyes affected

- Stage I:
  - Trachomatous inflammation - follicular (TF):
    - » 5 or more follicles (white, grey, yellow) in the upper tarsal conjunctiva
- Stage II:
  - Trachomatous inflammation - intense (TI):
    - » Intense inflammation with red, thickened conjunctiva in of the upper lid
    - » Follicles
- Stage III:
  - Trachomatous scarring (TS):
    - » Scarring of the tarsal conjunctiva (white lines or bands in the upper tarsal conjunctiva)
    - » Increased risk of entropium with resulting trichiasis
- Stage IV:
  - Trachomatous trichiasis (TT):
    - » At least 1 eyelash rubbing the cornea
    - » Ulceration and chronic inflammation of cornea
- Stage V:
  - Corneal opacity (CO):
    - » Vascularization of cornea (pannus)
    - » Scarring of cornea
    - » Loss of vision

 Diagnosis

- Early diagnosis crucial for prognosis
- Important:
  - Evert upper eyelid and examine the tarsal conjunctiva for inflammation, follicles or scarring (ask the patient to look down and pull the eyelashes up while rotating the upper eyelid against a matchstick or similar object).
  - Check for corneal opacities.

 Treatment

Only early treatment can prevent blindness, only early stages can be cured completely.

- Stage I/II:
  - Facial cleanliness:
    - » Cleaning of eyes and face several times during the day with clean water

- Systemic antibiotic treatment:
  - » Azithromycin:
    - » Child > 6 months: 30 mg/kg single dose
    - » Adults: 1 g single dose
    - » Treat whole family.
    - » Pregnancy: prefer Erythromycin for 7 d
    - » If Azithromycin not available give:
- Topical treatment:
  - » Tetracycline eye 1% ointment to be applied bid for 6 weeks to both eyes
- Stage III:
  - Azithromycin PO and Tetracycline eye ointment
  - Surgical intervention as early as possible to avoid persistent corneal damage (but relapse rate ca. 40%)
- Stage IV: surgery, if possible
  - WHO strategy:
    - » "SAFE" = surgery (for trichiasis), antibiotics, facial cleanliness, environmental improvement (improved access to clean water)
    - » Goal: eradication of blinding trachoma by 2020
- Stage V: no treatment



#### Prevention

- Education regarding cleanliness and hygiene is very important to prevent transmission and reinfection (e.g. advice regarding regular daily face and hand washing with clean water).
- Education regarding use of latrines and burning of rubbish etc.

## XEROPHTALMIA (VITAMIN A DEFICIENCY)

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#### Description

Ocular manifestation of Vitamin A deficiency; leading to blindness



#### Concerned persons

Affects mainly children, particularly those with malnutrition or measles, and pregnant women



#### Epidemiology

Southern Asia and Sub Saharan Africa more affected than Southeastern Asia and tropical South America

## Cause

Malnutrition, esp. the lack of milk, eggs, meat, sea fish

## Symptoms

- First symptom is loss of dim light vision, then night blindness,
- Then:
  - Conjunctival xerosis (dry, thick, wrinkled bulbar conjunctivae)
  - Bitot's spots (bilateral greyish or slight yellowish patches on conjunctivae)
  - Corneal xerosis -> corneal ulcerations
  - Keratomalacia (softening of the cornea, eyeball might perforate, blindness)

## Diagnosis

Clinical picture; history (of night blindness initially)

## Treatment

- Retinol (Vitamin A):
  - Children 6 to 12 mts, < 8kg: 100 000 IU OD on D(day)1, D2 and D8
  - Children > 1yr, > 8kg and adults (not pregnant: 200 000 IU on D1, D2, D8
  - Pregnant women:
    - » with vision impairment or Bitot's spots: 10 000 IU OD x 4 weeks (do not exceed dosis b/o risk of foetal malformations)
    - » with cornea affection, risk of blindness outweighs teratogenic risk:
    - » 200 000 IU on D1, D2, D8
- Cornea lesions are an emergency: give tetracycline eye ointment BD and protect eye with eye-pad

## Prevention

In endemic areas routine supplementation is indicated:

- children 6-12 mts: 100 000 IU every 4 to 6 months
- children 1 -5 years: 200 000 IU every 4 to 6 months
- mothers in childbed: 200 000 IU immediately or within 8 weeks
- Children suffering from measles: one dose on D1 and D2



## ORAL DISEASES AND DENTAL PROBLEMS

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### Description

- Decayed teeth: common problem of patients attending consultation; mainly requesting for painkillers.



### Symptoms

- Blisters, aphts and mouth ulcers: (f.e. HSV,EBV,enteroviruses) common in children, may be associated with HIV
- Glossitis: often seen in iron or vit.B deficiency, tropical sprue + malnutrition
- Oral candidiasis (thrush): does always call for HIV testing
- unsightly orange-black staining of mouth and teeth is often seen with betel chewers (very common in South Asia)
- Dental infections: possible cause of pyrexia of bacterial endocarditis or abscess formation in different organs or (Ludwig's) angina
- Gum disease: gum is red instead of pink; bleeds easily, retracts from teeth's neck, possibly pus, abscess
- Teething: no interventions; give hard biscuits to chew on, paracetamol prn
- Impacted wisdom tooth: infected gum flap might need AB or incision
- Tooth abscesses: Signs are constant pain, also at night, tooth is painful when tapped, might feel "longer", a sore at the root's end
- Acute apical abscess: Fluctuation, Facial swelling (and sometimes sore, fistula), Complication: retropharyngeal abscess with airways obstruction



### Differential Diagnosis

- Headache, pain over the sinuses, in the temporal area:
  - Possible cause: nonvital tooth in the upper jaw
  - Diagnosis: pain on percussion of affected tooth
  - Rule out Sinusitis maxillaris and refer for extraction of tooth.
- Headache, ear ache:
  - Possible cause: nonvital tooth in the lower jaw
  - Diagnosis: pain on percussion of affected tooth
  - Rule out Otitis and refer for extraction of tooth.
- Sores on the cheeks, the neck:
  - Possibly dental sinus: check for decayed or rotten teeth
  - Possibly severe gum disease ("trench mouth").
  - (Cave: necrotic gum disease in malnourished African children are possibly a beginning Noma [cancrum oris] disease which needs i.v.-antibiotics and surgery

a.s.a.p.!)

- Stomach pain, difficulties with digestion, malnutrition:
  - Can be caused by inability to chew food properly due to loss of teeth.
- Facial swelling
  - tooth abscess, ingrowing new teeth, spit gland inflammation, injury, mumps, sinusitis, a tumor

### Therapy

- Blisters, aphts and mouth ulcers: gargling with warm salt water qid, soft food; steroids oral or as beclomethasone spray, GV-lotion topical or aciclovir can be considered,; PCM; zinc for children < 5yrs
- Oral candidiasis (thrush): nystatin topical treatment; severe cases may require oral fluconazole (200mg odx2 weeks)
- Dental infections/Gum disease:
  - if mild: warm salt water gargling qid, PCM, vitamins
  - if more severe: remove bigger tartar pieces with probe or tweezers; Penicillin, mouth wash with 3% diluted iodine lotion
- Acute apical abscess:
  - Do (or refer for) incision and possibly drainage
  - Antibiotics: Penicillin V: children: 30-60 mg in 3-4 divided doses, adults: 500 mg qid (or Clindamycin or Erythromycin) 5 to 7 days, first dose always doubled!
  - Analgesics: paracetamol or NSAID prn.

### Prevention

Important to remember

- Check teeth of patient and advise extraction of decayed teeth and root segments if necessary.
- Give simple instructions on healthy nutrition and on dental hygiene e.g. thorough cleaning and massage of the marginal gingival ("area where the gum touches the tooth").
- Pregnant women and malnourished children are prone to gum diseases: advise for careful dental hygiene and nutrition
- The mouth is a doorway to infections in both ways - in and out: always wear gloves! Use sterilized instruments only.

## FILARIASIS

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### Description

Tissue-dwelling nematode worms, existing in the adult form of microfilariae and the larvae, microfilariae; transmitted by insect vector



### Concerned persons

Living in endemic areas, esp. when exposed to frequent mosquito bites



### Epidemiology

Southern, eastern, southeastern Asia, tropical areas of South America, sub-Saharan Africa plus Egypt



### Cause

- *Wuchereria bancrofti* (tropics), *Brugia malayi* (East and South East Asia, South India)
- *Onchocerca volvulus* (South America, West Africa)

### Transmission

- *Wuchereria bancrofti*, *Brugia malayi*: mosquito species (anopheline mosquito, culex, aedes; night-biting)
- *Onchocerca volvulus*: simulium species (day-biting)



### Symptoms

In our projects filariasis will usually be seen as „Elephantiasis“ (*Wuchereria* et al.) or, very rarely, as „River blindness“ (*Onchocercosis*)

- Lymphatic filariasis (*Wuchereria bancrofti*, *Brugia malayi*):
  - Acute: Asymptomatic or bouts of fever, lymphangitis and lymphadenitis
  - Chronic: Lymphoedema of legs: asymmetrical, non-pitting (elephantiasis)
- Onchocerciasis (river blindness; rarely encountered in our projects)
  - Skin (microfilariae in the skin): pruritus, papular rash with secondary infection, premature ageing of skin
  - Eye: keratitis, iritis with redness, irritation and photophobia, corneal sclerosis leading to blurring of vision and blindness



### Diagnosis

- Lymphatic filariasis:
  - Microfilariae in the blood (nocturnal blood sample required) or serological test: usually unavailable in our projects
- Onchocerciasis:

- Skin snips (if feasible: rarely)
- Eye examination (split lamp if available)

### Treatment

- Symptomatic:
  - Anti-inflammatory drugs e.g. acetylsalicylic acid 600 mg tid-qid (adults, children > 12 years) and/or
  - Antihistamines e.g. diphenhydramine:
    - » Children: 1-2 mg/kg tid prn, Adults: 50 mg tid prn
- Therapeutic:
  - Lymphatic filariasis:
    - » For mass chemotherapy (national program in endemic areas, once a year):
    - » Diethylcarbamazine (DEC) 6 mg/kg single dose (SD) **plus**
    - » Albendazole (children > 2 years, adults): 400 mg SD
    - » Individual patient (acute or early stages - in manifest elephantiasis the effect of treatment is doubtful):
    - » Doxycycline 100 mg bid for 4 weeks (treatment of the wWolbachia bacteriae, which live in endosymbiosis with Wucheria and Brugia); contraindicated in pregnant women, children < 12 years.

#### **followed by**

» Ivermectin (if available): children, adults: 200 mcg/kg SD

**Or**, preferably and if available

» Diethylcarbamazine 6 mg/kg SD

» Both drugs are given to eradicate (at least reduce) microfilariae

» Advice regarding the lymphoedema:

» Cleanliness: washing with soap and water, cutting of toenails

» Elevation of affected limb at night

» Immediate treatment of infected wounds or abrasions

- Onchocerciasis:
  - Mass chemotherapy (national program in endemic areas)
    - » Ivermectin: children, adults: 200 mcg/kg once per year
  - Individual patient: Ivermectin; children, adults: 200 mcg/kg SD, repeat after 6-12 months if symptoms recur.

## HELMINTHIASIS

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### Description

Most common helminths:

- Soil transmitted helminths (nematodes= round worms): enterobius vermicularis (pinworm, threadworm), trichuris trichiura (whipworm), ascaris lumbricoides (round-worm), ancylostoma duodenale (hookworm, highest prevalence in our projects!), strongyloides stercoralis (dwarf threadworm)
- Trematodes (sucking worms): schistosoma japonicum, mansoni, haematobium
- Cestodes (tape worms): taenia saginata, taenia solium



### Concerned persons

- Mainly children; but all ages can be affected
- Simple living conditions and rural areas preferred



### Epidemiology

- Worldwide, preferably warm climates



### Cause

- Parasites: see following sub chapters

### Enterobius vermicularis (pinworm, threadworm)



#### Concerned persons

- Common in children
- Often the whole family affected and people living in crowded conditions



#### Symptoms

- Mainly perianal pruritus (nocturnal, when female migrates to anus)
- Possible:
  - Right iliac fossa pain (DD: appendicitis)
  - Vulvitis (worm migrating up the vulva)
  - Non-specific symptoms like insomnia, loss of appetite, weight loss



#### Diagnosis

- Clinical manifestations
- Transmission:
  - Direct from anal or perianal region to mouth (under fingernails) or by soiled night clothes or bed linen

- Retroinfection possible: eggs hatch on the anal mucosa, larvae migrate up the bowel
- Life cycle:
  - Eggs are ingested; worms invade the terminal ileum, caecum
  - Mature female deposits eggs near the anus
  - Size: 1 cm; color: white

#### Treatment

- Treat the whole family
- Mixed infections with other worms possible
- Albendazole:
  - Children < 2 years: 200 mg single dose
  - Children > 2 years and adults: 400 mg single dose; avoid in pregnancy (first trimester)
- Mebendazole:
  - Children > 2 years, adults: 100 mg bid for 3 days
  - Repeat after 2 weeks; avoid in pregnancy (first trimester).

#### Prevention

- Education about personal hygiene, short fingernails

### Trichuris trichiura (whipworm)

#### Concerned persons

Most common in small children (dirtier habits; eating of dirt); in areas with warm, humid climate and where fields are fertilized with faeces

#### Symptoms

- Most infections: asymptomatic
- In heavily infected patients:
  - Diarrhoea with blood; no fever
  - Right iliac fossa pain, epigastric pain, rectal prolapse
  - Iron deficiency anemia
  - Growth retardation
- Can be associated with entamoeba histol., ascaris, hookworm, shigellosis.
- Can lead to exacerbation of other parasitic infections.
- Size: 3-4.5 cm; colour: white or pink

## Diagnosis

- Eggs in faeces
- Clinical manifestations (rectal prolapse with worms)
- Transmission
  - Ingestion of food contaminated with soil containing eggs of trichuris trichiura
- Life cycle
  - Infective embryonated eggs are ingested, hatch in the intestine
  - Adult worms live in large bowel feeding on tissue juices

## Treatment

- Mebendazole:
  - Children > 2 years, adults: 100 mg bid x 3 days; avoid in pregnancy (first trimester)
- Albendazole:
  - Children < 2 years: 200 mg OD x 3 days
  - Children > 2 years, and adults: 400 mg OD x 3 days; avoid in pregnancy (first trimester)
  - Less effective than mebendazole

## Prevention

- Safe disposal of human faeces (use of latrines)
- Advice regarding personal hygiene
- Education regarding careful washing of vegetables and fruit

## Ascaris lumbricoides (roundworm)

### Concerned persons

- Most common in childhood (children > 2 years), less in adulthood

### Epidemiology

- Mainly in countries with poor sanitation

### Symptoms

- Lungs:
  - Cough, wheeze, dyspnoea, pneumonia („Loeffler’s Syndrome“)
  - Eosinophilia (on migration of larvae through the lungs)
  - Settling spontaneously
- Bowel:

- Recurrent colic, distended abdomen
- Occasionally signs of obstruction (due to high worm load, volvulus or intussusception) with severe infection
- With migrating worms:
  - Obstructive jaundice, appendicitis, pancreatitis (esp. after fever or anaesthetics);
  - Abscesses (e.g. in liver) or granulomas (peritoneum)
- Infection may contribute to malnutrition and vitamin A deficiency.
- Often co-infection with other parasitic diseases
- Size: 20-40 cm; pink or white
  - Partial immunity can be acquired.



### Diagnosis

- Eggs in faeces, clinical manifestation
- Transmission:
  - Ingestion of water or food (raw vegetables, fruit) contaminated with eggs of *A. lumbricoides*
  - Occasionally via inhalation of contaminated dust
- Life cycle:
  - Eggs are passed with faeces, mature in the soil, are ingested with infected food, hatch in the bowel as infective larvae.
  - Larvae penetrate the bowel wall, migrate via blood stream to the lungs where they perforate the alveoli to get access to bronchi and trachea; they move up to the epiglottis and are swallowed.
  - Mature worms live in the small intestine.



### Treatment

- Albendazole:
  - Children < 2 years: 200 mg single dose
  - Children > 2 years and adults: 400 mg single dose; avoid in pregnancy (first trimester)
- Mebendazole:
  - Children > 2 years and adults: 100 mg bid for 3 days; avoid in pregnancy (first trimester)
- With signs of obstruction or acute abdomen: refer to hospital
- Pulmonary symptoms (self-limiting):
  - Treat with bronchodilators or oral steroids as required.
  - Anthelmintic therapy should preferably be given after settling of pulmonary symptoms (to avoid problems caused by dying larvae).



## Prevention

- Education regarding hygiene e.g. washing hands before meals
- Advice to boil water before drinking

## Ancylostoma duodenale (hookworm)



## Concerned persons

- High prevalence in Asia, Africa; *Necator americanus* predominant in Middle and South America, Africa, southern Asia
- Grows well in warm, humid climate (can also exist in Europe, e.g. in mines).
- Usually affected: adults e.g. farmers who defecate on the fields; also children affected in areas with poor sanitation (no latrines), esp. when walking with barefoot



## Symptoms

- Occasionally pruritus at entry-site with vesicles and pustules (ground itch)
- Occasionally asthma, bronchitis: cough, wheeze, fever, eosinophilia (with lung passage of worms)
- Often hypochromic, microcytic anemia (esp. *A. duodenale*):
  - Pallor, tiredness, dyspnoea, oedema
  - Esp. if severe infection and/or insufficient iron intake
- Epigastric pain, occasionally melaena
- Failure to thrive
- Size of worm: about 1 cm; white, grey or red (from ingested blood)



## Diagnosis

- Iron deficiency anemia (exclude other causes of iron loss)
- Eggs in faeces (may be negative in the early stages of the infection)
- Transmission:
  - Penetration of larva through intact skin or
  - Ingestion of food contaminated with eggs
- Life cycle:
  - Eggs are passed with faeces, hatch in the damp soil.
  - End stage infective larvae penetrate intact skin and migrate via bloodstream to the lungs; break through the alveoli, move up the bronchi and trachea to the oesophagus where they are swallowed.
  - In the small intestine they change into adult worms and attach to the mucosa, sucking blood.

## Treatment

- Albendazole:
  - Children < 2 years: 200 mg single dose
  - Children > 2 years and adults: 400 mg single dose; avoid in pregnancy (first trimester)
- Mebendazole:
  - Children > 2 years and adults: 100 mg bid; avoid in pregnancy (first trimester)
- Elementary iron (adjust dosage according to age and available preparation e.g. ferrous sulphate : elementary iron 3 : 1) for 3 months
  - Inform about dark stools and stomach side effects of therapy
- Folic acid:
  - Children < 1 year: 0.5 mg/kg OD for 1 month
  - Children > 1 year and adults: 5 mg OD for 1 month
- Advice regarding iron-rich nutrition

## Prevention

- Advice to wear sandals or shoes
- Advice regarding hygiene, cleanliness and sanitation

## Strongyloides stercoralis (threadworm)

### Concerned persons

- Mainly in warm humid areas, but also in mines in colder climate
- Immunity develops after primary infection.

### Symptoms

- Dermal symptoms:
  - Pruritus and rash at site of penetration
  - Itchy weal (linear, on trunk, of short duration) with larvae moving under the skin (larva currens)
  - Urticaria due to allergy in sensitized persons
- Respiratory symptoms:
  - Cough and wheeze
  - Dyspnoea, haemoptysis
- Abdominal symptoms:
  - Watery diarrhoea
  - Abdominal pain (often vague)

- Chronic infection possible (with autoinfection):
  - Usually asymptomatic
  - Occasionally recurrent episodes of fever
  - Sometimes mild pneumonitis resembling recurrent bacterial pneumonia
  - Possible: severe respiratory illness e.g. obstructive pulmonary disease (worse with steroids), acute respiratory failure
- Severe infection (hyperinfection syndrome) in immunocompromised patients or patients receiving steroids:
  - Larvae invade f.e. bowel wall, lymph glands, liver, brain; resulting in diarrhoea, malabsorption, ileus, septicaemia, encephalitis etc.



### Diagnosis

- Larvae or adult worms in faeces
- Size: 2 mm
- In disseminated strongyloidiasis: larvae in sputum and different body fluids e.g. peritoneal fluid
- FBC: eosinophilia
- Life cycle and transmission:
  - Adult worms in bowel produce eggs which hatch in the bowel (internal sexual cycle) into non-infective larvae; these are passed with the faeces.
  - In damp soil they develop into adults and reproduce (external sexual cycle).
  - Infective larvae can develop; they penetrate the skin, travel via blood stream to the lungs and break through the alveoli to gain access to bronchi and trachea; they are swallowed and pass into the small bowel where they develop into adult worms.



### Treatment

- Albendazole:
  - Children < 2 years: 200 mg bid x 3 days
  - Children > 2 years, and adults: 400 mg bid; avoid in pregnancy (first trimester)
  - Repeat treatment after 2 weeks
- Ivermectin:
  - Treatment of choice, if available
  - Children > 15 kg and adults: 200 mcg/kg single dose
  - Repeat treatment after 2 weeks.
- In disseminated disease (hyperinfection syndrome):
  - Children > 15 kg and adults: Ivermectin 200 mcg/kg od
  - Duration of treatment: 5 days

- Repeat stool investigation after treatment.
- Patients with severe illness, pregnant women: refer to hospital

### Taenia saginata, taenia solium (tapeworm)



#### Concerned persons

- Problem in areas with poor sanitation and where people traditionally eat undercooked or raw meat



#### Symptoms

- Taenia saginata:
  - Nondescript symptoms ("hunger pains")
  - Rarely intestinal obstruction
- Taenia solium:
  - Cysticercosis:
    - » Encystation of larvae in muscles, skin (subcutaneous tissue), eye or brain with resulting calcification
    - » Extraneuronal cysticercosis: often asymptomatic
    - » Cerebral cysticercosis: epilepsy and/or raised intracranial pressure



#### Diagnosis

- Proglottids (10-20mm) or eggs in stool
- Worm size: 5-8 m
- Cysticercosis: calcifications visible on x-ray
- Transmission:
  - Taenia saginata: ingestion of raw or undercooked beef
  - Taenia solium: ingestion of raw or undercooked pork; cysticercosis can develop after eating food contaminated with eggs or eating with fingers contaminated with infected faeces.
- Life cycle:
  - Larvae encapsulated in meat (cysticerci) are eaten.
  - Cysts turn into worms with heads attaching themselves to mucosa.
  - Proglottids (segments: up to 2000, containing fertilized eggs) grow; they are highly motile, detach themselves and are shed with the faeces.
  - Eggs are swallowed by cattle, develop into invasive larvae and break through the intestinal wall into the circulation; from there they are carried to the muscle where they encapsulate into cysticerci.

### Treatment

- Taeniasis:
  - Praziquantel:
    - » Children and adults: 5-10 mg/kg single dose
  - Niclosamide: alternative, if available
- Cysticercosis:
  - Anthelmintic therapy not always necessary
  - Refer neurological cysticercosis of taenia solium to hospital for assessment and possible treatment.

### Prevention

- Cook meat thoroughly

## LEISHMANIASIS

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### Description

Protozoa cause this antropozoonosis, located either in skin, visceral organs or mucocutaneous tissue

### Concerned persons

Living in endemic areas, close to intermediate hosts like dogs and other species and exposed to the sandfly vectors

### Epidemiology

- Cutaneous leishmaniasis (oriental sore):
  - Old world: Mediterranean, Middle East, North Africa, Bangladesh to East India
  - New world: Northern South America, Central America
- Visceral leishmaniasis (kala-azar): Mediterranean Basin, East Africa, India, Bangladesh, Brazil

### Cause

- Leishmania species: transmitted by the bite of female Phlebotomus sandflies (biting at dawn and dusk and during the night)
- Reservoir: animals e.g. foxes, dogs etc.

### Symptoms

- Depending on the patient's cell-mediated immunity
- Cutaneous leishmaniasis:

- Old world:
  - » Single or multiple itchy nodules (“oriental sore”) on inoculation site (face, neck, arms, legs)
  - » Later with central crust and ulcer (with raised edges), painless, healing very slowly and leaving a depressed hypopigmented scar
  - » lesions along the draining lymphatics may develop
  - » Usually lifelong immunity, but recurrence possible in patients with impaired immunity
- New World:
  - » Ulcers, often bleeding, often on ear with local cartilage destruction; lymphnode involvement common
- Mucocutaneous leishmaniasis (metastatic lesions develop up to 10 years after the appearance of an ulcer on the skin) and
- Visceral leishmaniasis (kala-azar) will rarely be seen in our projects:
  - Fever, hepatomegaly, splenomegaly, possibly ascites
  - Lymphadenopathy, pancytopenia
  - Severe weight loss, can cause cachexia
  - In India: hyperpigmentation of skin, esp. of face, hands, body (“kala-azar” = black sickness)
  - If untreated, death in 80-90% of patients
  - Opportunistic infection: 70% of patients also infected with HIV



#### Diagnosis

- Cutaneous leishmaniasis: split skin smear (Giemsa staining)
- Visceral leishmaniasis:
  - Serology e.g. ELIZA
  - Isolation of parasites from spleen, bone marrow or lymph nodes



#### Differential Diagnosis

For Cutaneous L.: tropical ulcers, skin abscesses, other parasites/bacteriae, skin cancer



#### Treatment:

- Cutaneous leishmaniasis, Old world:
  - Paromomycin ointment (if available)
  - Heat treatment of wounds can be an option
- Cutaneous leishmaniasis (New World), mucocutaneous and visceral leishmaniasis:
  - Refer to hospital for assessment and further treatment, e.g. with Sodium Stibogluconate, Amphotericin B or Miltefosin.

Think of leishmaniasis if a patient presents with a persistent ulcer on face, neck or arms

## MALARIA

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### Description

- Most important of all tropical diseases
- High morbidity and mortality
- Distribution: tropical and subtropical areas



### Causative agents:

- Plasmodium falciparum: malaria tropica, predominantly Sub-Saharan Africa
  - Plasmodium vivax, Plasmodium ovale: tertian malaria
  - Plasmodium malariae: quartan malaria



### Transmission:

- Bite of infected female anopheline mosquito (sporozoites in the saliva of the mosquito)
  - Mother-to-child transmission (transplacentally)
  - Transmission through blood transfusion

### Life cycle:

- Multiplication: schizogony (asexual multiplication) in humans, gametogony (sexual multiplication) in female anopheles mosquito
  - Schizogony (asexual multiplication):
    - With bite of mosquito sporozoites are injected in the blood stream.
      - » Tissue schizogony:
        - » 30 minutes post infection they enter liver cells, divide into pre-erythrocytic schizont, containing merozoites.
        - » Possible: dormant stage of sporozoite in liver (= hypnozoite; plasmodium vivax, ovale), awaking at a set time
        - » When mature, schizont releases merozoites into the blood stream (after 5-12 days).
      - » Blood schizogony:
        - » Merozoites enter red cells, develop into trophozoites, then into schizonts which rupture releasing merozoites in the blood stream.
        - » P. falciparum, vivax, ovale: blood schizogony completed in 48 h
        - » P. malariae: blood schizogony completed in 72 h

- » *P. vivax*, *ovale*, *malariae*: schizogony in the circulating blood
- » *P. falciparum*: schizogony in capillaries deep in the body – therefore rarely seen in the peripheral blood; also: cytoadherence of parasitized erythrocytes to endothelial surfaces leading to large numbers of parasites in deep tissues

Release of parasites to the blood stream coincides with bouts of fever but there is often no periodicity.

- Gametogony (sexual multiplication):
  - Merozoites develop into gametocytes (male and female) inside the red cells.
  - If swallowed by a mosquito they develop further into micro- and macrogametes; these unite and, after several stages, produce sporozoites which migrate to the salivary glands of the mosquito.



#### Concerned persons

All ages can be affected, but children who have not yet acquired a semi-immunity are especially prone to severe malaria which may cause death within a few hours.



#### Symptoms

- Incubation period:
  - *P. falciparum*: 7-30 days
  - *P. vivax*, *ovale*: about 2 weeks, but can relapse several months up to several years (due to hypnozoites)
  - *P. malariae*: about 2-4 weeks
- Fever: recurrent (often no periodicity such as every 2nd or 3rd day), with rigors, hot and sweating stages
- anemia (haemolytic); severe in *P. falciparum*
- Splenomegaly
- Jaundice
- Vomiting, diarrhoea (DD: gastroenteritis)
- Cerebral malaria with delirium, disorientation, convulsions, stupor, coma
- Renal failure, occasionally with oliguria, haemoglobinuria (Blackwater fever: due to intravascular haemolysis)
- Pulmonary oedema
- Hypoglycaemia: esp. at risk: children, pregnant women
- Disseminated intravascular coagulation
- Severe disease mainly due to infection with *P. falciparum*
- Recrudescence (recurrent attacks in untreated malaria due to persistent blood

forms):

- *P. falciparum*: recurrent attacks over one year, then no further attacks
- *P. malariae*: recurrent episodes for up to 30 years
- *P. vivax, ovale*: relapsing fever over several years (true relapse due to hypnozoites in the liver)
- Malaria in pregnancy:
  - Higher rate of miscarriage and stillbirths due to placental insufficiency
  - Risk of maternal death with severe malaria due to hypoglycaemia and pulmonary oedema (increased risk of developing severe malaria during pregnancy, esp. during the first pregnancy)
  - Increased risk of anemia
  - Babies: low birth weight
  - Occasionally congenital malaria
- Malaria in children:
  - High risk: children < 5 years
  - Fever, malaise
  - Anorexia, diarrhoea, vomiting
  - Coma, convulsions
  - Lactic acidosis, hypoglycaemia
  - Severe anemia

Immunity:

- Mainly in *P. falciparum* infections and rather incomplete (adults who survived recurrent malaria episodes experience severe malaria less often than non-immune persons)
  - Due to development of IgG cell-mediated immunity and antitoxic immunity
  - Frequent re-exposure to infection is required (therefore higher risk of acquiring an infection after longer exposure-free interval).

### Diagnosis

- Thick film with Giemsa stain – to be taken at least three times at intervals; may be negative (even with severe disease) because of sequestration of parasites in the deep capillaries

Note:

A positive film does not necessarily prove that the symptoms of the patient are due to malaria (parasitaemia even in asymptomatic patients in endemic areas); consider other

diseases as well, e.g. typhoid fever.

- Rapid diagnostic test (RTD):
  - Test for detection of specific antigens of plasmodium falciparum, vivax or ovale
  - Sensitivity 40-95% (86,7% according to [Malar J.](#) 2018; 17: 333) (with > 100 parasites per ul blood; comparable to experienced microscopist)
  - Problems: test not resistant to heat; false negative results; result remains positive for up to 3 weeks, even after successful treatment.
  - Gives only qualitative but no quantitative result
  - No replacement for thick film
  - Use before starting stand-by treatment

Always treat patients with suspected malaria even with negative RTD as there is a possibility of a false negative result.



### Differential Diagnosis

Malaria is a great mimic of several clinical presentations:

f.e. dengue, typhoid, influenza, meningitis, acute abdomen, sepsis, pneumonia and other severe febrile diseases



### Therapy

It is of utmost importance to check the current national guidelines and local drug resistance when treating patients for malaria.

For *Pl. falciparum* often coformulated ACT-blisters are available (ACT= Artemisinin-based combination therapy)

- Supportive treatment:
  - Sponge with tepid water.
  - Rehydration
  - Monitor renal output, blood glucose (!! ) and haemoglobin and treat accordingly.
  - Treat convulsions or other complications.
- Specific treatment:
  - Chloroquine:
    - » Should **only** be used in areas with partial or no resistance to plasmodium falciparum or in patients with quartan or tertian malaria.
    - » Important: correct dose (narrow therapeutic margin)!
    - » Adults:
      - » 600 mg PO stat (4 tab at 150 mg)

- » 300 mg at 6 hours
- » 300 mg on day 2 and 3
- » Children:
  - » 10 mg/kg PO stat
  - » 5 mg/kg at 6 hours
  - » 5 mg/kg on day 2 and 3
  - » If vomiting: same dose can be given IM, but avoid in children < 6 years or < 15 kg
- » Drug resistance to Chloroquine: 3 types according to WHO:
  - » R 1: disappearance of parasite under treatment within 7 days, but relapse
  - » R 2: noticeable fall without disappearance of the parasite
  - » R 3: no reduction of parasite level in spite of treatment
- Quinine (with Chloroquine resistance):
  - » Adults:
    - » Loading dose: 20 mg/kg IV, then 10 mg/kg tid IV or IM (IM: 1 mL = 300 mg; IV: 1mL = 60mg, give in 5% glucose to counteract hypoglycaemia due to quinine)
    - » Change to oral medication as soon as possible: 600 mg tid (2 tab at 300 mg) and **add**: Doxycycline 100 mg bid.
  - » Children:
    - » Loading dose 20 mg/kg, then 10 mg/kg tid IV or IM (give IV medication in 5% glucose)
    - » Change to oral medication as soon as possible: 30 mg/kg in 3 divided doses.
    - » Duration of treatment: 7 days minimum
- Mefloquine (with **relapse**: rising trophozoites, rising temperature; no vomiting):
  - » Adults:
    - » 750 mg PO (3 tab at 250 mg) stat
    - » 500 mg after 6 hours
    - » If body weight > 60 kg: 250 mg after another 6 hours
  - » Children (> 6 months, > 5 kg):
    - » 15 mg/kg PO (max. 750 mg) stat
    - » 10 mg/kg after 6-12 hours (max. 500 mg)
  - » If no clinical improvement within 48-72 hours use alternative therapy for re-treatment.
  - » Avoid in pregnant patients and patients with neuropsychiatric disorders (e.g. depression, convulsions).
- Primaquine:

- » In India and the Philippines
- » For eradication of hypnozoites
- » If diagnosis of tertian malaria is confirmed, **low risk of reinfections** and good compliance of patient
- » Adults: 15 mg PO od
- » Children: 0.25 mg/kg PO od
- » Duration of treatment: 15 days
- » Important: test or at least ask for Glucose-6-phosphate-dehydrogenase deficiency before starting treatment to avoid risk of haemolytic anemia
- Artemisinin:
  - » Only in combination with other drugs e.g. ("ACT")
  - » Artemether 20 mg + Lumefantrin 120 mg (Riamet ® or Coartem®)
  - » Adults, children > 16 years, > 35 kg):
    - » 4 tab PO stat, then at 8 hours, 24 hours, 36 hours, 48 hours, 60 hours (total 24 tablets in 60 hours)
    - » Children (2 months to < 16 years, WHO recommendations):
      - » 5-14 kg: 1 tab PO stat, then at 8 hours, 24 hours, 36 hours, 48 hours, 60 hours (total 6 tablets over 60 hours)
      - » 15-24 kg: 2 tab PO stat, then at 8 hours, 24 hours, 36 hours, 48 hours, 60 hours (total 12 tablets over 60 hours)
      - » 25-34 kg: 3 tab PO stat, then at 8 hours, 24 hours, 36 hours, 48 hours, 60 hours (total 18 tablets over 60 hours)

If a *P. falciparum* treatment is started by the parental route, a complete 3-day-oral course of ACT should follow as soon as the patient can tolerate it.

- Treatment in pregnancy:
  - If malaria is suspected refer to hospital immediately.
  - WHO treatment recommendations:
    - » First trimester: Quinine **plus** Clindamycin PO for 7 days
    - » Second and third trimester: Artesunate (first line treatment; can be given PO or IV), Artemether (2nd line treatment; can be given PO or IM)
    - » Avoid Mefloquine (study in Thailand: higher rate of stillbirths)
    - » Contraindicated: Primaquine, Doxycycline



#### Prevention

- regarding protective clothing, esp. in the evening (**light** long clothes)
- Use impregnated mosquito nets and/or curtains if available

## SCHISTOSOMIASIS

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### Causative agents:

- *Schistosoma japonicum* (Philippines)
  - *Schistosoma haematobium* (Africa)
  - *Schistosoma mansoni* (Africa)
  - Other more locally distributed species



### Transmission:

- Contact with water containing cercarial larvae (e.g. through washing, swimming, working in rice fields)

### Life cycle:

- Eggs are passed with faeces or urine.
  - Miracidium hatches and invades water snail as intermediate host where it undergoes asexual replication.
  - Cercariae are released and penetrate human skin, undergo changes and reach the liver where they mature into adult flukes.
  - Eggs pass into host tissues and are excreted.



### Concerned persons

- Persons in contact with water containing cercarial larvae (e.g. through washing, swimming, working in rice fields)



### Symptoms

- Early reaction (swimmers' itch, shortly after infection):
  - Puritic papular rash with erythema, oedema, eosinophilia
  - Rare in endemic areas
  - Resolves spontaneously after 10 days.
- Initial stage (4 weeks after penetration; immune complex disease):
  - Katayama fever:
    - » Not regularly seen; mainly in children or young adults
    - » Can be severe with fever, urticaria, diarrhoea, hepato-splenomegaly, cough and wheeze, cachexia.
    - » Often spontaneous recovery
  - Established infection (caused by granulomas due to retained eggs):
    - » *S. japonicum*, *mansoni*:
    - » Liver fibrosis with hepatosplenomegaly and portal hypertension, ascites and bleeding from oesophageal varices

- » Pseudopolyposis of colon with ulceration and bleeding
- » Involvement of peritoneum (tumors) and skin (rash)
- » Cerebral granulomas with symptoms of raised intracranial pressure, development of epilepsy or focal neurological symptoms
- » In *S. japonicum*: patients often have nonspecific symptoms
- » *S. haematobium*:
  - » Eggs in the bladder lead to granulomatous lesions (pseudo-papillomata) with haematuria
  - » Complications: obstruction of ureters and obstructive uropathy with hydronephrosis, hydroureter, kidney failure, calcification of the bladder with chronic dribbling, bladder carcinoma, kidney stones
  - » Ectopic lesions can occur in lung, liver, CNS.

### Diagnosis

- History: consider *Schistosoma haematobium*, if a patient reports many frustrane UTI treatments with AB
  - Kato-katz-test (stained smear from stool; negative result does not exclude infection)
  - Dipstick: blood in urine
  - Rectal biopsy and CT-scan are usually unavailable in our projects
  - Ultrasound (to check liver, kidneys, bladder)

### Differential Diagnosis

- Any liver disease (*S. Mansoni*), bowel disease, any urinary tract disease which causes haematuria.

### Therapy

- Katayama fever:
  - NSAIDs, e.g. Ibuprofen:
    - » Children > 7 kg: 20 mg/kg in 3 divided doses
    - » Adults: 400-800 mg tid
  - Prednisolone:
    - » If severe hypersensitivity reaction
    - » Children: 1 mg/kg OD
    - » Adults: 40 mg OD
    - » Duration of treatment: 5 days
  - Praziquantel: start 6-10 weeks after initial presentation (ineffective in early infection).

- *S. japonicum*:
  - Praziquantel:
    - » Children, adults: 60 mg/kg in 2-3 divided doses at least three hours apart
    - » Can be given in pregnant and lactating women, preferably not in the 1st trimester of pregnancy.
- *S. haematobium*, *mansoni*:
  - Praziquantel:
    - » Children, adults: 40 mg/kg in 1-2 divided doses for 1 day
    - » Can be given in pregnant and lactating women, preferably not in the 1st trimester of pregnancy.
  - Neurological disease:
    - » Praziquantel and Glucocorticoids to counteract inflammatory response due to treatment of Praziquantel and to avoid deterioration of neurological symptoms



### Prevention

Advice regarding hygiene and safe disposal of urine and faeces, avoid barefeet exposure to schistosoma infected waters or paddy fields.



## MENINGITIS

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### Epidemiology

- Often epidemic in developing countries with meningococci type A and C as causative agents (unlike Europe where mainly meningococci B are found)
- More often in people living in poor conditions (low income, poor housing), esp. in children in slums

### Cause

Causative agents: differ with age of patient and with epidemic vs non-epidemic context

- Epidemic context (esp. dry season in the Sahelian>sub-Saharan zone): suspect Meningococci A, or C or W135), obtain actual public health survey data!
- Non-epidemic context:
  - In newborns mainly: Group B streptococcus, Pseudomonas, Listeria, E. coli, Klebsiella
  - Infants 7 d to 3 months: mainly pneumococci, oc. Listeria
  - Children > 3 months: meningococci, pneumococci, Haemophilus influenzae B
  - Adults: meningococcus, pneumococcus;
- with impaired immunity: pathogens similar to those in newborns
- Viral: ECHO-virus, coxsackie, mumps, polio, herpes

### Symptoms

Depending on causative agent

- Bacterial:
  - Pyrexia (sudden onset)
  - Headache, backache, nausea, may be confused
  - Neck stiffness: Brudzinski and Kernig's signs positive (lying patient involuntarily flexes the knees when the neck is flexed or when the legs are raised vertically with knees in extension)
  - Babies and small children: often nonspecific signs e.g. inability to drink, drowsiness, convulsions; bulging fontanelle
  - Tuberculous meningitis: gradual onset, headache, drowsiness; later: convulsions, cranial nerve involvement e.g. diplopia, ptosis
- Viral:
  - Acute onset
  - Occasionally signs of underlying disease e.g. parotitis, paralysis with poliomyelitis, skin infection

- Complications:
  - Waterhouse-Friedrichsen's-Syndrome:
    - » Fulminant meningococcal septicaemia with purpuric rash due to haemorrhages in skin and mucosa, renal failure, shock
    - » Often fatal despite treatment
  - Surviving patients may have long-term neurological problems e.g. deafness, spasticity, mental retardation, epilepsy, speech impairment.



### Diagnosis

If meningitis is suspected start treatment straight away prior to hospital referral for further investigations and treatment.

- Lumbar puncture; if available, ask for gram staining and direct microscopy of cells
- Cell count in the cerebrospinal fluid (CSF)



### Differential Diagnosis

- Cerebral malaria
- Typhoid fever
- Consider underlying cause of meningitis e.g. sinusitis, otitis media, head injury, endocarditis, pneumonia.



### Therapy

Give first dose prior to hospital transfer.

- Infants < 2 months:
  - Ampicillin **IM/IV**: 50 mg/kg qid **plus**
  - Gentamycin **IM/IV**:
    - » First week of life: 3 mg/kg od with low birth weight; 5 mg/kg od with normal birth weight
    - » After second week of life: 7.5 mg/kg od
- Children > 2 months:
  - » Oily chloramphenicol **IM**: 25 mg/kg qid **plus**
  - » Ampicillin **IV/IM**: 50 mg/kg qid or, if available:
  - » Ceftriaxone **IV/IM**: 100 mg/kg OD (plus Ampicillin)
- Adults:
  - » Oily chloramphenicol **IM**: 100 mg/kg OD (up to 3 g; if necessary half of the dose in each side); avoid in pregnant women **or, if available**:
  - » Ceftriaxone **IV/IM**: 2 g OD (plus Ampicillin)

- Pregnant or breastfeeding women:
  - » Ampicillin **IV/IM**: 2 g qid **or, if available**:
  - » Ceftriaxone **IV/IM**: 2 g OD (plus Ampicillin)
- Duration of treatment depends on pathogen and underlying disease:
  - » Meningococcus: 7-10 days
  - » Pneumococcus, haemophilus: 10-14 days,
  - » Listeria: 4-6 weeks

The earlier meningitis is treated the better is the prognosis.



#### Prevention

- Vaccine for meningococcal meningitis available (vaccine anti A, C, W or Y; protection: 3 years); if there is an increase in patients with meningitis in an endemic area mass vaccination should be started as soon as possible.

## OSTEOMYELITIS

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#### Description

Osteomyelitis is a combination of osteitis and cortical inflammation. Acute and chronic conditions are possible - symptoms for more than six weeks might be seen as chronic.



#### Concerned persons

Osteomyelitis can be found in every age.



#### Epidemiology

In remote settings Osteomyelitis, especially the chronic form, is frequent after ineffective treated bacterial infections, open fractures or neglected wounds. The disease has a severe effect on education, social life and economical status of the patient.



#### Cause

Osteomyelitis is rather achieved haematological or related to trauma or internal fixation.



#### Symptoms

Inflammation with pain, localized hyperthermia, swelling and limitation of movement. Patients with chronic osteomyelitis often present with only a small ulcer of the skin with draining pus.

## Diagnosis

FBC, ESR (which will be checked regularly to follow the infective activity). Rule out HIV and tuberculosis.

An x-ray on first presentation of the patient might not show visible signs of the bone-inflammation, but should be seen as an important tool for follow up. In chronic cases periosteal reaction, changes in bone structure, arthrosis of an effected joint and forming of a sequestrum might be seen.

Please take a swab of the wound on first presentation, possibly of deep structures to verify or change the calculated antibiotic treatment later.

## Therapy

Treatment can either be done to cure the disease or to improve the condition for the patient (palliative). Regarding international studies, there is no consent for a guideline to treat chronic osteomyelitis. Since surgery is essential for curative treatment and quite some patients will not be able or willing to afford this, palliative treatment will be offered to reduce symptoms though the prognosis is poor.

Antibiotic treatment for 6 months or years does not make sense and should be avoided. If surgery is not available, symptom control should be the aim. The patient and his relatives have to be counseled, that this is NOT the necessary treatment and will probably lead to relapses.

Please explain the options thoroughly to the patient and at least one relative.

To cure chronic osteomyelitis, additional to the antibiotic treatment, surgery is essentially necessary, either in removal of the effected bone parts and reconstruction or in amputation.

In cases of **acute** osteomyelitis, patients should be sent to hospital for iv-antibiotic treatment and further management. A swab has to be taken, best from deep structures, when the result is there, antibiotic treatment has to be adjusted.

75% of bone infections are caused by staphylococci, therefore antibiotic treatment for **children** can be started with Cloxacillin (first choice) or  $\beta$ -Lactam-Antibiotics (e.g. Amoclav) or Clindamycin for at least 2 weeks (parents have to be instructed well to never interrupt or stop treatment), follow-up has to be guaranteed to avoid loss of efficiency.

A plaster-of-paris-splint might be applied, if the bone is instable or very painful.

**Adults** have to be treated at least for 4-6 weeks, e.g. 4 weeks of Cloxacilline, 2 weeks of Clindamycin.

**Both** need to be treated according to the swab-result after starting calculated treatment,

- need weekly follow-up, best by the long-term-doctor, if available, otherwise by the surgeon (who has to write readable! so that follow-up by the next short term surgeon is possible.

- have to come back BEFORE the last tablet is taken,
  - need control of ESR and x-ray (children after 2 weeks, adults after 4-6 weeks).
- If the infected bone forms a sequestrum, surgery is essential.

Palliative treatment, if surgery is not possible, includes debridement, anti-infective treatment and pain control.

Dressings have to be changed and fistulas need to be flushed regularly, abscesses need incision and drainage (verify in ultrasound).



### Prevention

Immediate and effective treatment of bacterial infections and open fractures, avoiding internal fixation in septic conditions, good hygiene, education of the patient.

## TYPHOID FEVER

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### Description

Disease caused by infection of the intestine with *Salmonella typhi* from the Enterobacteriaceae family.

It is contagious and can assume endemic proportions.



### Concerned persons

Children (between 3 and 19 years of age) are particularly susceptible to typhoid fever in endemic areas. The disease is particularly common in countries with inadequate hygiene standards and limited access to clean water.



### Epidemiology

Typhus abdominalis occurs in all countries of the world. Endemic areas are found in Asia (90%), South America and Africa. The incidence of typhus abdominalis is about twelve million people and about 130,000 deaths per year.



### Cause

Typhus abdominalis is caused by bacterial pathogens of the Enterobacteriaceae family (*Salmonella enterica* serotypes Typhi and Paratyphi A, B, C).

The disease is transmitted mainly by contaminated water and food. Direct faecal-oral transmission is less common. The risk of developing typhoid fever increases with

- weakened immune system (e.g. HIV infection)
- higher age
- taking medication (e.g. H2 blocker) and

- infection with *Helicobacter pylori*.

### Symptoms

Diarrhoea without fever, with blood

Incubation period 10-20 days.

Duration of untreated illness: about 4 weeks.

1st week: Non-specific symptoms:

- Headache, fatigue
- Constipation (often initially), diarrhoea
- Cough
- Remittent fever (increasing day by day, temperature spike in the evening)
- Relative bradycardia (= heart rate does not rise as high as it would be expected in fever spikes)

Later: Very unwell:

- Abdominal pain, diarrhoea (like "pea-soup")
- Hepatosplenomegaly
- Altered mental state (up to 30% of cases), meningitis, deafness
- Rose spots (fade on pressure; difficult to distinguish in dark skin)

Complications:

- Perforation or haemorrhage of the bowel (up to 15% of cases!)
- Myocarditis, pneumonia,
- Haemolytic uraemic syndrome
- Disseminated intravascular coagulation
- In pregnancy: miscarriage, intrauterine death

### Diagnosis

Consider it in endemic areas in patients with clinical manifestations – as there is no reliable test for typhoid fever treat if disease is suspected.

FBC (leukopenia, leucocytosis)

Blood culture, stool sample

Widal test (test for antibodies; usually NOT indicated nor available):

- Problems: antibody titres can be high in endemic areas, after infections with other salmonellae or after immunization; some patients show no antibodies or no rise in antibody titres (fourfold rise required for significance).
- Test is not helpful before 2nd week of illness, whereas treatment should start earlier.

### Differential Diagnosis

- Paratyphoid (incubation period between 1 and 10 days, the course of it is more

blande and usually shorter. The ratio between paratyphoid and typhus is 1:10).

- Malaria
- Dengue fever
- spotted typhus (rickettsiosis), leptospirosis, brucellosis,
- In relapses, schistosomiasis must be ruled out.

### Therapy

General measures such as:

- antipyretics
- Hydration (oral, i.v.)
- appropriate, light diet with high fibre content
- close observation of abdominal findings
- Antibiotic therapy:  
Salmonella Typhi has a different resistance spectrum to antibiotics (i.e. Ciprofloxacin, the former drug of choice) in different countries. German doctors should inquire with local colleagues which therapy is used at the respective location. A combination of a third-generation Cephalosporin, a Gyrase inhibitor and Azithromycin is often required.  
In the case of permanent dropouts, an experiment with Ampicillin and Probenicid (for six weeks) or Ciprofloxacin (for four weeks) may provide a cure. In our projects, however, for logistical reasons, we usually do not succeed in discovering permanent dropouts.

### Prevention

Avoid foods that may have been in contact with potentially contaminated water (raw fruits and vegetables, seafood, juices, ice cubes, etc.).

„Cook it, boil it, peel it or leave it!“

Water used to clean food must be boiled for at least one minute.

Before preparing and consuming food, the hands must be thoroughly cleaned.

Vaccinations against typhoid fever are satisfactorily effective (60 to 70 %). In endemic areas, the vaccination in particular of children makes sense. For this, however, patients should be referred to state projects (if any).



## DENGUE

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### Description

- Widespread in Asia, esp. South-East Asia, Western Pacific; also Central and South America, less common in West- and East Africa but increasing.
- Four different serotypes
- Long lasting immunity develops to the infecting serotype, short lived immunity to the other serotypes.



### Concerned persons

- Symptoms more severe in older children and adults



### Epidemiology

- Dramatic increase in transmission worldwide, especially in urban areas



### Cause

- RNA-virus, 4 serotypes
- Transmission: Human to human by bites of *Aedes aegypti* mosquito which flies during the day



### Symptoms

- Incubation period 5-8 days
  - High fever, occasionally biphasic
  - Relative bradycardia
  - Severe headache, pain behind the eyes, photophobia, conjunctivitis-like “red eyes”
  - Myalgia (severe: break bone fever), arthralgia
  - Anorexia
  - Rash: initially maculo-papular, erythematous, generalized; later: rubella-like and/or petechial with scattered pale patches on arms, hands, legs, feet (“white islands in a red sea”)
  - Generalized lymphadenopathy
  - Haemorrhagic complications possible e.g. epistaxis, bleeding from gums, haematuria
  - sometimes hepatitis; occasionally delir



### Diagnosis

- Leucopenia
- Often thrombocytopenia

## Therapy

- Symptomatic with painkillers e.g. paracetamol
- Avoid aspirin (risk of bleeding)
- If at home: drink sufficient amount of water

## Severe Dengue

### Description

Often in a second episode of Dengue in life, after previous infection with different serotype causing dengue fever, but may happen also in first episode of Dengue in life  
Pathophysiological changes: increased vascular permeability leading to leakage of plasma, haemoconcentration and shock

### Symptoms

- High fever, acute onset, continuous for 2-7 days
  - Anorexia, abdominal pain, vomiting
  - severe arthralgia and (mainly periorbital) headache
  - Haemorrhagic manifestations: petechiae, ecchymosis, bleeding from nose and gums, haematemesis, melaena
  - Hepatomegaly
  - Shock syndrome, a critical stage at the end of febrile period:
    - » Cold clammy skin, restlessness
    - » Signs of shock (rapid weak pulse, hypotension, narrow pulse pressure)
    - » Possible: oedema, pleural effusion, ascites, encephalitis, respiratory distress with kidney failure

### Diagnosis

- Thrombocytopenia (thrombocytes < 100 000/mm<sup>3</sup>)
- Haemoconcentration: rise in haematocrit by 20% above average for age and sex
- Leucopenia with relative lymphocytosis

### Therapy

- Supportive treatment e.g. antipyretics (avoid aspirin)
- Increase fluid intake.
- Refer to hospital for fluid replacement:
  - If shock start IV Infusion with Ringer's Lactate solution or normal saline at 10-20mL/kg over 20 minutes; repeat prn once or twice until vital signs (pulse, blood pressure) and haematocrit improve, then reduce.

- Check blood sugar (?hypoglycaemia); if hypoglycaemia give dextrose 10% 5 mL/kg.
- Avoid excessive fluid replacement.
- Treatment usually necessary for 24-48 hours

## HEPATITIS

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### Description

viral lesion of hepar

#### Hepatitis A:

- Transmission: faecal-oral route

#### Hepatitis B:

- Transmission: parenteral route (blood and blood products, IV-drugs), sexual intercourse (65%), mother-to-child transmission

#### Hepatitis C:

- Transmission: parenteral route (e.g. shared needles in drug users, multiple use of needles for medical purposes), rarely with sexual intercourse

#### Hepatitis D:

- Transmission: parenteral route with blood and blood products, sexual intercourse

#### Hepatitis E:

- Transmission: faecal-oral route, possible: zoonotic spread (virus found in cows, pigs, goat and other animals)

### Concerned persons

see Epidemiology

### Epidemiology

#### Hepatitis A:

- Mainly children affected, asymptomatic in 50-90%; adults: fulminant forms possible
- Common in developing countries due to poor housing and living conditions, lack of proper disposal of rubbish and poor standards of sanitation and hygiene

#### Hepatitis B:

- Worldwide: prevalence 6%

- HbsAg prevalence: Philippines 16%, Kenya: 6-15%; India 5%, Bangladesh: no data, South America: 1-5%
- In 5-10%: chronic infection
- Self-limiting in 90% of adult patients (children: less than 10%); chronic hepatitis in 5%
- Main cause for development of hepatocellular carcinoma worldwide

#### Hepatitis C:

- Worldwide: 3% prevalence
- Mainly asymptomatic forms
- Chronic hepatitis in 50% of patients (20% of patients: cirrhosis of the liver with 1% developing liver cell carcinoma)

#### Hepatitis D:

- Only in patients with hepatitis B or as superinfection in chronic HbsAg carriers

#### Hepatitis E:

- Severe illness in pregnant women: mortality: 20% when infection occurs in the 3rd trimester

#### Symptoms

common: asymptomatic or mild jaundice

symptomatic forms:

- weakness, fever
- nausea, upper abdominal pain, jaundice
- dark urine, clay coloured stools
- severe forms with liver failure possible with hepatitis A, B or E

#### Diagnosis

- Differentiation of hepatitis types B to E is not indicated as there are no therapeutic consequences (interferon or ribavirin too expensive in our settings)

#### Differential Diagnosis

Important because of therapeutic consequences:

- Malaria
- Gallstones, cholangitis, blocked bile ducts due to ascariasis, schistosomiasis, haemolytic diseases

### Therapy

- Bed rest
- Supportive treatment e.g. hydration, nutritious diet
- Antipyretics and analgesics and PCM are contraindicated in the acute phase due to risk of side effects.

### Prevention

- Every pregnant mother should be tested for HbsAg, either by us or at the official antenatal checkup so that babies can be immunized straight after birth when possible.
- Good hygiene (sanitary conditions, safe disposal of faeces)
- Exclusive use of single use sterile needles
- Avoidance of application of IV- or IM-medication when oral medicine is effective and available
- In acute cases or if chronic carrier of B, C, D: avoid unprotected sexual intercourse
- Recommend vaccination for HA and HB, if feasible
- Hepatitis B:
  - WHO: Hepatitis B vaccination recommended as part of the "Expanded Program on Immunization"

## HIV

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### Description

Two subtypes of the Human Immune-Deficiency Virus HIV (whereof HIV-2 is less virulent and less transmissible than HIV-1 and is found mainly in Westafrica) weaken the immune system by causing a deficit in CD-4 T lymphocytes.

### Concerned persons

- Sub-Saharan Africa: HIV transmission mainly during heterosexual intercourse; other regions: mainly infection of certain risk groups (commercial sex workers, intravenous drug users, men having sex with men)
- Equal numbers of men and women affected, but number infected women has increased in many regions
- Risk of mother-to-child transmission high (without intervention: 25-48%)
- Often blood products not checked for HIV or problems with window period
- Treatment often not affordable.

### Epidemiology

Worldwide 40 Mio infected, 70% in sub-Saharan Africa, 15% South East Asia.

Number of people living with HIV/AIDS (PLWHA) increasing with ongoing number of new infections and more widely available antiretroviral therapy. Southern Africa: most heavily affected (AIDS still commonest fatal illness). HIV epidemic leading to reduced life expectancy, increased household poverty and reduced economic growth in the most heavily affected countries.

### Cause

- HI-virus (an RNA containing retrovirus, which can be transformed into the host cell's DNA by reverse transcriptase enzyme. HIV 1+2 are lymphocytotrope and neurotrope, thus damaging these tissues directly)
- Transmission:
  - Highest viral concentration in blood, semen, vaginal secretion; esp. in the first weeks after acute infection or with symptomatic disease
  - **No** transmission in everyday life; **no** spread by droplets of sputum
  - 0.1-0.5% risk of infection with unprotected sexual intercourse
    - » 2-9 fold increased risk of transmission if STD present
  - Mother-to-child transmission during pregnancy, delivery or breast-feeding
  - Blood products (~95% risk of infection): problem with window period (no antibodies found with recent infection)
  - Contaminated syringes: in less than 5% cause of transmission; less relevant in developing countries
- Incubation time:
  - 1 – 3 months before HIV-AB are present in serum
  - 10 +/-2 years between infection and AIDS in the Western world, considerably shorter in developing countries (perinatal infection: 5 years in average)

### Symptoms

- Several stages:
  - Primary infection or acute retroviral illness:
    - » Not all patients affected
    - » 2-4 weeks after exposure, self-limiting
    - » Fever, malaise, headache, lymphadenopathy
    - » Diarrhoea, nausea, skin rashes
    - » Seroconversion after 3 months
  - Asymptomatic HIV-infection:
    - » Viral replication, but clinical latency
    - » Gradual decline of T-helper cells
    - » Lasting for up to 10 years before break-down of immune system

- » Period may be shorter in developing countries.
- Symptomatic HIV-infection/AIDS:
  - » Impairment of immune system due to destruction of T-helper cells
  - » Weight loss, weakness, lymphadenopathy
  - » Additional opportunistic infections and neoplasms (increasing)
  - » Strong correlation with tuberculosis (10% risk per year for people living with HIV)
  - » Untreated leading to death, 1/3 due to tuberculosis)
- WHO Clinical Staging of HIV/AIDS for Adults and Adolescents:
  - Stage 1:
    - » Asymptomatic
    - » Persistent generalized lymphadenopathy
  - Stage 2:
    - » Moderate weight loss (< 10% of body weight)
    - » Minor mucocutaneous manifestations (seborrhoeic dermatitis, prurigo, fungal infection, recurrent oral ulcerations, angular cheilitis), herpes zoster, past or recurrent within last 2 years
    - » Recurrent upper respiratory tract infections
  - Stage 3:
    - » Severe weight loss (> 10% of body weight)
    - » Unexplained chronic diarrhoea > 1 month
    - » Unexplained prolonged fever > 1 month
    - » Oral candidiasis
    - » Oral hairy leucoplakia (OHL)
    - » Pulmonary tuberculosis (PTB) in past year
    - » Severe bacterial infections
  - Stage 4:
    - » HIV wasting syndrome
    - » Pneumocystis jiroveci pneumonia (PCP)
    - » Recurrent severe bacterial pneumonia (>1 episode within 1 year)
    - » Cryptococcal meningitis and extrapulmonary cryptococcosis
    - » Cerebral toxoplasmosis
    - » Chronic orolabial, genital or ano-rectal herpes simplex infection for > 1 month
    - » Kaposi's sarcoma (KS)
    - » HIV encephalopathy
    - » Extrapulmonary TB (EPTB)
    - » Cryptosporidiosis with diarrhoea > 1 month

- » Isosporiasis
- » Disseminated non-tuberculous mycobacterial infection
- » Cytomegalovirus (CMV) retinitis or disease of the organs (other than liver, spleen or lymph nodes)
- » Progressive multifocal leucoencephalopathy (PML)
- » Any disseminated endemic mycosis (e.g. histoplasmosis)
- » Candidiasis of oesophagus or airways
- » Non-typhoid salmonella (NTS) septicaemia
- » Cerebral lymphoma or B-cell non-Hodgkin lymphoma (NHL)
- » Invasive cervical cancer
- » Visceral leishmaniasis
- Different clinical stages for children



### Diagnosis

- At present testing only done in our project in Nairobi, in other projects to be done by public testing institutions
  - Rapid test (Determine Immunoassay)
  - With positive test: confirmation with 2nd rapid test (Bioline)
- Problems:
  - No antibodies in the early stages (diagnostic window)
  - Maternal antibodies are present in an infant for up to 20 months without the child being infected
- Further blood tests:
  - CD4 count
  - Full blood count (anemia, neutropenia, thrombocytopenia)



### Differential Diagnosis

Other primary or acquired immune deficiencies, malignancies



### Therapy

- In most projects: patients with suspected HIV need to be referred to specialized institutions
- One example: **Baraka Treatment and Care Program, of our Nairobi project; adapted to local national guidelines:**
  - Medical treatment (follow-up program) for all patients (independent of HIV-stage):
    - » Cotrimoxazole for prevention of opportunistic infections
    - » Multivitamins
    - » Deworming

- » Review every 1-3 months
- » CD4 count every 6 months
- Support group for HIV-positive patients, e.g.
  - » Regular meetings
  - » Memory Books
- Feeding program if indicated
- Home based care for bed-ridden patients
- Prevention of mother-to-child-transmission (PMTCT):
  - » HIV-positive mothers:
    - » Regular CD4 counts
    - » Antiretroviral therapy according to guidelines
  - » Infant intervention:
    - » Antiretroviral therapy including nevirapine
    - » Cotrimoxazole
    - » Feeding program after birth (formula milk; mothers advised regarding hygiene)
- Highly Active Antiretroviral Therapy (**HAART**)
  - » For patients with CD4 < 350 (stage 1,2,3) or stage 4 (irrespective of CD4) and proven compliance
  - » Before starting medication:
    - » Blood tests e.g. FBC, CD4 count, LFTs
    - » Assigning patient to community health worker and “treatment buddy” supervising intake of medication
  - » Combination of at least 3 antiviral drugs e.g. Stavudine (D4T) or AZT + Lamivudine (3TC) + Nevirapine
  - » Regular follow-ups with blood tests, attendance of support group
- Treatment of opportunistic infections if possible, otherwise referral
- Post-Exposure-Prophylaxis (PEP) after exposure to blood or certain body fluids of patient with possible HIV-infection:
  - Risk of transmission: 0.3% after percutaneous exposure to HIV-infected blood (possibly higher with large-bore needle, high viral load)
  - Indication for HIV-PEP:
    - » **Recommended after:**
      - » Percutaneous injury with injection needle or other hollow needle (high risk fluids like blood, bloody body fluids, CSF)
      - » Superficial injury (e.g. with surgical needle) if index patient probably has high viral load, otherwise PEP should be offered
      - » Contact with high-risk body fluids to mucous membranes or non-intact skin

- » **Not** recommended after:
  - » Percutaneous contact with other body fluids (e.g. urine, saliva)
  - » Contact of intact skin with blood
  - » Contact of skin or mucous membrane with body fluids like urine or saliva
- Immediate treatment:
  - » Percutaneous injury: encourage bleeding, then rinse thoroughly with alcohol-based antiseptic
  - » Contamination of non-intact skin: rinse thoroughly with > 80% ethanol-based preparation (e.g. Frecaderm) + PVP-iodine
  - » Contamination of eye or mouth: rinse thoroughly with isotonic watery PVP-iodine solution (eye: 2.5%, mouth: PVP-iodine 1:1 dil.)
  - » If antiseptic solutions not available: use water for immediate rinsing of contaminated area
- Medication:
  - » Start as soon as possible within 72 hours – preferably within 2 hours
  - » Prophylaxis with
    - » Combivir® (lamivudine + zidovudin) 1 tablet bid + Viracept® (nelfinavir) 2 tablets bid or Combivir® 1 tablet bid + Kaletra® (lopinavir + ritonavir) 3 tablets bid
    - » Duration of treatment: 4 weeks
    - » Blood tests: HIV-test (including index patient), hepatitis serology; repeat after 6 weeks, 3 months and 6 months
- Documentation of injury



## Prevention

- Education regarding avoidance of high risk behaviour and use of condoms (best done by trained staff)
- Prevention of mother-to-child-transmission through education and medication
- Treatment of sexually transmitted diseases
- Reduction of blood transfusions in anaemic patients to the absolute minimum:
  - Transfusions should only be given in life-threatening events. Even for chronic anemia with haemoglobin < 5 g/dl treatment with ferrous sulphate and folate is usually sufficient.
  - Important: treatment of underlying conditions such as hookworm infections, malaria, schistosomiasis, malnutrition.

Important to remember:

- No treatment of HIV/AIDS should be done without structured pre-test and post-test-

counselling.

- It is of utmost importance to minimize risk of HIV-transmission when handling possibly contaminated body fluids!
- Always wear safety equipment e.g. gloves and goggles or gowns if necessary.
- Always dispose of sharps safely.
- In case of injury: do not forget documentation of event.

## MEASLES (MORBILLI)

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### Description

- One of the most common childhood infectious exanthems – but nowadays unknown to most doctors from Europe.
- A major killer in childhood: higher mortality rate in developing countries, esp. when associated with malnutrition and vitamin A deficiency (“do not count your children until the measles have passed”)!)

### Cause

#### Causative agent:

- Paramyxovirus

#### Transmission:

- Spread by droplets

### Symptoms

- Incubation period: 7-10 days
- Infectious period: from the 8th day of the incubation period until 5 days after onset of rash
- Catarrhal phase with fever, runny nose, bilateral conjunctivitis, cough and Koplik’s spots (specific sign, but may be absent: red spots with bluish-white center on buccal mucosa) for 2-3 days, weak general condition
- Eruptive phase: Rash (maculo-papular, beginning on face and spreading down to limbs within 3 to 4 days difficult to recognize in dark skin). Unlike the varizella rash in Measles all the efflorescences are at the same stage, are non-pruritic and blush on pressure.
- The eruptive phase is followed by skin desquamation, 1 - 2 weeks.
- Complications:
  - Respiratory:
    - » Bronchopneumonia (risk of activating underlying tuberculosis)
  - ENT:

- » Otitis media
- » Laryngitis (often with stridor; might be croup-like)
- Gastrointestinal:
  - » Diarrhoea with risk of dehydration and malnutrition
  - » Stomatitis, also with thrush and herpes leading to problems eating or sucking
- Ophthalmological:
  - » Conjunctivitis with risk of corneal ulceration and keratomalacia leading to blindness, esp. in patients with vitamin A deficiency
- Persistent pyrexia with severe rash (black measles) and desquamation
- Rarely encephalitis (with residual brain damage)

### Therapy

Treat fever with tepid sponging and paracetamol.

- Isolate hospitalized patients
- Keep eyes wet and clean; if pus discharge: tetracycline 1% eye ointment.
- Important!: Give vitamin A:
  - Patients without sign of vitamin A deficiency:
    - » Children < 6 months: 50 000 IU day 1 and 2
    - » Children 6 to 12 months: 100 000 IU day 1 and 2
    - » Children > 1 year, adults (unless women of childbearing age): 200 000 IU day 1 and 2
  - Patients with sign of vitamin A deficiency (e.g. Bitot's spots, corneal ulceration, keratomalazia):
    - » Children < 6 months: 50 000 IU day 1, 2 and 8
    - » Children 6 to 12 months: 100 000 IU day 1, 2 and 8
    - » Children > 1 year, adults (unless women of childbearing age): 200 000 IU day 1,2 and 8
  - Keep well hydrated and nourished
  - Continue breastfeeding
  - In case of diarrhoea: give
    - » ORS and zinc supplements (see chapter Moderate dehydration)
  - Antibiotics (high doses, esp. for patients with high risk of complications e.g. severely malnourished children, patients with HIV-infection or with signs of pneumonia):
    - with penicillin allergy: Erythromycin:
      - » Children: 50 mg/kg in 3 divided doses
      - » Adults: 750 to 1000 mg tid

- Amoxicillin:
  - » Children: 80 mg/kg in 3 divided doses
  - » Adults: 1000 mg tid
- Duration of treatment: 5 days
- Ceftriaxon i.v. in severe cases -> hospitalize.
- Follow-up:
  - » If cough continues think of tuberculosis
  - » Regular weight control and check-ups (Road to Health Chart); advice regarding extra meals



### Prevention

- Immunization: from the age of 9 months to 12 years and up to the 3rd day post incubation (during the first 6 to 9 months the baby is protected by maternal antibodies; therefore, immunization may not be effective)

### Important to remember:

- It is of utmost importance to check the immunization status regarding measles and immunize if not yet done.
- Treatment with vitamin A can significantly reduce morbidity (esp. the risk of blindness) and mortality in children with measles.

## RABIES

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### Epidemiology

- High risk in developing countries due to high prevalence of disease in stray animals (99%: dog bites)
- Concerning our projects: mainly a problem in Kolkata, Bangladesh and the Philip-pines, less common, but existing, in East and West Africa



### Cause

#### Causative agent:

- Rhabdovirus

#### Transmission:

- Saliva of infected animal, mainly bites of dogs but also cats, bats on broken skin or mucous membranes
- Inoculation possible before developing signs of illness (14 days for cats, dogs)

## Symptoms

- Different types of exposure (WHO 2009):
  - Category I (no real exposure):
    - » Touching or feeding of animals
    - » Licks on intact skin
  - Category II:
    - » Minor scratches or abrasions without bleeding
    - » Licks on broken skin
    - » Nibbling of uncovered skin
  - Category III:
    - » Single or multiple transdermal bites or scratches
    - » Contamination of mucous membrane with saliva from licks
- Incubation period: 2 weeks to several months (up to 1 year)
- Rapid onset with fever, anxiety, pain and paraesthesia at the side of bite; insomnia
- Painful spasms of throat muscles, hydrophobia
- Later: widespread paralysis, respiratory arrest
- With the onset of clinical symptoms: death inevitable (due to meningoencephalitis with neuronal destruction)

## Therapy

- Symptomatic disease:
  - Refer to hospital or state-run animal bite center.
- Treatment of fresh wound (important!):
  - Wash and flush bite and scratch wounds immediately with soap and plenty of water (for about 15 minutes).
  - Apply antiseptic (e.g. Povidone iodine solution).
  - **Postpone** suturing if possible
  - Tetanus prophylaxis
- Vaccination depends on type and condition of animal at time of bite and after 10 days.

Avoid contact with patient's saliva – it is potentially infective.

## Prevention

- Vaccination – depending on exposure category and immunization of patient:
  - People without immunization or with incomplete previous immunization:
    - » Category I:
      - » No vaccination necessary

- » Category II:
  - » **Immediate** rabies vaccination: one dose IM on day 0, 3, 7, 14, 28 (adults: in deltoid muscle, children < 2 years. anterolateral area of thigh); alternative: two doses IM on day 0 (deltoid muscle, right and left arm), 1 dose on day 7 and 1 dose on day 21 (regimen 2-1-1)
  - » Immunocompromised patients: give additional immuno-globulin (see treatment for category III exposure).
  - » **Avoid** gluteal muscle (poor response!).
- » Category III:
  - » **Immediate** rabies vaccine (same scheme as above) **plus**
  - » **Immunoglobulin** (preferably human rabies immunoglobulin HRIG 20 IU/kg, but often short supply; otherwise equine rabies immunoglobulin ERIG 40 IU/kg; small risk of hypersensitivity reactions) as much as possible infiltrated around the wound, the rest to be given IM at a site distant from vaccine administration (e.g. into anterior thigh).
  - » Give on day 0 (**as soon as possible**, but not later than 7 days after the initiation of post-exposure vaccination)
- Immunized patients after exposure:
  - » Rabies vaccine: as soon as possible one dose IM day 0 and 3
  - » Immunocompromised patients (e.g. HIV-patients): give full post-exposure prophylaxis.

Important to remember:

- Even immunized people need post-exposure booster vaccination.
- With treatment of wounds: do not forget tetanus prophylaxis or antibiotics e.g. Cefuroxime or Erythromycin.
- According to the latest guidelines of the WHO (2018) patients who present for evaluation and rabies post-exposure prophylaxis even months after having been bitten should be dealt with in the same manner as if the contact occurred recently.



## CHANCROID

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### Cause

- Haemophilus ducreyi
- Most common cause of genital ulceration in Africa; increasing HIV risk

### Symptoms

- Incubation period 2-6 days
- Painful soft ulcer, bleeding on contact; often multiple
- Painful inguinal lymphadenopathy, occasionally with fistula formation or local destruction
- Resolves spontaneously within 1 year

### Differential Diagnosis

- Primary syphilis
- Herpes simplex
- Lymphogranuloma venereum

### Treatment

- See syndromic approach (STD)
- Azithromycin 1g SD or Ceftriaxon 250mg IM SD
- or Ciprofloxacin 1g/d x3d or Erythromycin 2g/d x7d

## CHLAMYDIAL INFECTION

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### Cause

- Chlamydia trachomatis
- (Co-infection with gonorrhoea possible)

### Symptoms

- Often asymptomatic
- Symptoms similar to gonorrhoea
- Males: urethritis
- Females: vaginal infection; ascending infection leading to pelvic inflammatory disease with risk of ectopic pregnancy or infertility
- Infection of the newborn: conjunctivitis, pneumonia

## Diagnosis

- Clinical picture
- PCR of urine sample, if feasible (usually not)

## Treatment

- Chlamydial infection in adults:
  - See syndromic approach for LGV
  - In uncomplicated cases: azithromycin SD or doxycycline 100mg BD x 7d
- Infection of the newborn (suspected chlamydial infection):
  - Erythromycin syrup 50 mg/kg PO in 4 divided doses for 14 days and
  - Ceftriaxone: 50 mg/kg IM single dose (maximum 125 mg; see treatment ophthalmia neonatorum gon.)

## GENITAL HERPES

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### Cause

- Herpes simplex virus type 2 (HSV 2)

### Symptoms

- Vesicles, later ulcers, crusting over and resolving on genitalia, cervix
- Tender lymphadenopathy
- Pain (occasionally severe, causing constipation and retention of urine), dysuria
- Primary attack lasting for up to 3 weeks
- Subsequent attacks (occasionally up to 12/year) resolving faster
- High neonatal mortality if child is infected with herpes from mother

### Treatment

- See syndromic approach (STD) (aciclovir 400 TID x7d; analgetics prn)

Additional information: DSTIG-Leitfaden

## GLOMERULONEPHRITIS AND NEPHROTIC SYNDROME

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### Acute glomerulonephritis



#### Description

Does sometimes follow a streptococcal infection (pharyngitis, impetigo) or caused by auto-immune inflammation of the glomeruli, occurring after 1-5 weeks.



#### Concerned persons

Mainly in children over 3 years of age and adults.



#### Epidemiology

For reasons yet unknown GN is more common in tropical regions than in temperate regions, especially infection-associated GN is higher.



#### Cause

see description



#### Symptoms

- Proteinuria, haematuria
- Hypertension, occasionally with encephalopathy
- Oedema



#### Diagnosis

Urine examination and measurement of blood pressure



#### Differential Diagnosis

Other forms of nephritis, collagenosis, proteinopathies



#### Therapy

- Bed rest during the acute stage
- Low salt diet
- Antibiotics if caused by underlying streptococcal infection:
  - Children:
    - » Penicillin V 50 mg/kg in 3-4 divided doses or
    - » Erythromycin 50 mg/kg in 3 divided doses
  - Adults:
    - » Penicillin V 500 mg qid or

- » Erythromycin 500 mg qid
- Duration of treatment: 10 days
- Furosemide (with oedema):
  - » Children: 1 mg/kg single dose; if oedema not responding to steroids alone, it can be given in up to tid.
  - » Adults: 40 mg up to tid
  - » Adapt dose according to clinical response.
- Treat hypertension.
- ACE-Inhibitor is useful



#### Prevention

- Treat streptococcal infections (in >50% of cases impetigo) thoroughly

### Nephrotic Syndrome



#### Description

- Increased permeability of kidney capillaries, resulting in oedema, proteinuria, hypalbuminaemia, hypercoagulability



#### Concerned persons

- mainly children affected



#### Epidemiology

- Adults: Increasing prevalence due to increasing number of patients with diabetes mellitus and hypertension
- Children: increasing number of post-streptococci-GN



#### Cause

- Glomerulonephritis (most cases)
  - Diabetes mellitus (not rare)
  - Quartan malaria (rare)
  - Plasmodium (rare)
  - Amyloidosis (rare)

#### Symptoms

- Severe proteinuria (> 3 g/24 h)
- Hypoalbuminaemia (< 30 g/l)
- Oedema
- Hyperlipidaemia

- Later: hypertension
- Uncomplicated cases: often good prognosis with improvement after steroid treatment or spontaneous resolution

#### Diagnosis:

- History (?underlying disease)
- Urine dipstick (protein +++)
- Serum creatinine, electrolytes
- FBC, blood glucose
- 24-hours urine collection for 24-hours protein
- Renal ultrasound
- With suspected underlying malaria: blood smear for malaria parasites

#### Differential Diagnosis

- Kwashiorkor, cardiac failure and other oedematous diseases

#### Therapy

- Rest
- First manifestation:
  - If possible refer to hospital for further investigations and treatment e.g. diuretics, ACE-inhibitors, prednisolone (for minimal change glomerulonephritis) and diet advice.
  - Therapeutic options in adults:
    - » Diuretics: In severe cases: Furosemide: 40 mg up to 3 times/day
    - » ACE-inhibitors e.g.
      - » Enalapril: 10-20 mg OD
      - » Ramipril: 2.5-5 mg OD
    - » Diet:
      - » Low protein diet (protein restriction to 0.8-1 g/day; high protein diet leading to deterioration of renal function)
      - » Not necessary in patients with mild renal failure (glomerular filtration rate > 25 mL/min)
      - » Patients with advanced renal failure: only supervision of diet necessary as they take little protein anyway due to poor appetite
      - » Low salt diet and restricted water intake (with higher urine production more fluids can be given)
      - » Prednisolone if confirmed or highly probable GN (and when Tb and Malaria are ruled out)

- Therapeutic options in children:
  - » Furosemide
  - » Prednisolone: can be useful in children, esp. with minimal change glomerulonephritis, tuberculosis and malaria (in endemic areas) must be ruled out before patient is started on long-term steroids.



### Prevention

Check the children for complete immunizations. Treat any underlying cause of secondary NS.

## GONORRHOEA

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### Cause

- *Neisseria gonorrhoeae*



### Symptoms

- Males:
  - Urethritis with dysuria, 2- 5 d after infection
  - Thick yellow discharge
  - With ascending infection: fever, prostatitis, epididymitis (unilateral)
  - Urethral stricture
- Females:
  - Fewer symptoms with f.e. cervicitis, ca. 10 d after infection
  - Many women though can be asymptomatic
  - Urethritis, dysuria, vaginal discharge, bleeding
  - With ascending infection: endometritis, salpingitis; also pelvic inflammatory disease (PID) with fever and abdominal pain; later: increased risk of ectopic pregnancy, infertility
- Disseminated gonorrhea (few cases):
  - Arthritis
  - Dermatitis, purulent conjunctivitis
  - Endocarditis. Meningitis, sepsis
- Ophthalmia neonatorum:
  - In newborns (2-3 days) of mothers infected with gonorrhea
  - Bilateral purulent conjunctivitis
  - Perforation and scarring of cornea, leading to blindness

### Diagnosis

- Clinical picture
- If available: gram-negat. Intracellular diplococci in urethral or cervix smear and/or PCR

### Treatment

- Gonorrhoea in adults:
  - See syndromic approach (STD)
- Ophthalmia neonatorum:
  - Treatment:
    - » Ceftriaxone: 50 mg/kg IM single dose (maximum 125 mg)
    - » No need to give additional eye drops
  - Prevention:
    - » Tetracycline eye 1% ointment to both eyes or 1% silver nitrate solution (Crede's prophylaxis), if available

## LYMPHOGRANULOMA VENEREUM (LGV)

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### Cause

- Chlamydia trachomatis

### Symptoms

- Initially small painless genital ulcer, often unrecognized, resolving spontaneously
- Urethritis in men
- Second phase: painful lymphangitis, lymphadenitis with inguinal lymphadenopathy (buboes)
- Fever, malaise
- If untreated, may lead to chronic infection, with symptoms like genital elephantiasis, abscess formation, fistula, rectal and sigmoidal stenosis

### Diagnosis

- Clinical picture
- Chlamydia DNA test in urine, if (often not) available (no urethral or cervical swab required)

### Treatment

- See syndromic approach (STD)

## SEXUAL TRANSMITTED DISEASES (STD) / SEXUAL TRANSMITTED INFECTIONS (STI)

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Preliminary remark:

Difficult: differential diagnosis, esp. without being able to investigate appropriately (no microscope, no speculum). For therapy, therefore, a syndromic approach of STD (see below) is recommendable and established.



### Description

These infections have short- and long-term health consequences, i.e. pain, discharge, fever; then pelvic pain, infertility, tubal pregnancies and many secondary complications, they damage psychological health too, stigmatise, increase HIV risk.



### Concerned persons

People particularly at risk of contracting sexually transmitted diseases: commercial sex workers, their clients, bar workers, military, truck drivers, sailors, policemen



### Epidemiology

Worldwide, but higher in societies lack of established public health and with large vulnerable and marginalized groups who have difficulties in accessing healthcare.



### Symptoms and Diagnosis

See sub chapters for details and refer to “Syndromic approach” (below)

### What matters in general:

Important in taking a history:

- Privacy (if possible)
- Avoidance of moralistic attitude
- Questions to ask:
  - Nature and duration of symptoms
  - Drugs already taken
  - Sexual history
  - Previous medical history
  - Female patients: menstrual/obstetric history
- Information about HIV important



### Therapy

See this chapter's preliminary remark:

- Syndromic approach of STD

Check for 6 cardinal symptoms:

1. (male) urethral discharge
2. vaginal discharge
3. lower abdominal pain (female)
4. scrotal swelling
5. inguinal bubo
6. genital or anogenital ulcer

In all cases: encourage partner treatment!

### Male urethral discharge



Differential diagnosis:

- Gonorrhoea
- Chlamydial infection



Treatment:

- Ceftriaxon 250mg. IM if available (otherwise
- Cefixime 400mg p.o. SD) **plus**
- Doxycycline 100 mg bid for 7 days **or**
- Azithromycin 1 g single dose **or**
- Amoxicillin 500 mg tid for 7 days
- Persistent or recurrent symptoms of urethritis:
  - » Possibly due to drug resistance, poor compliance, re-infection
  - » In some cases: Trichomonas vaginalis infection:
  - » Try metronidazole 500 mg PO bid for 7 days
  - » Persistent symptoms: refer to hospital

### Vaginal discharge



Differential diagnosis:

- Candida albicans
- Bacterial vaginosis (Gardnerella vaginalis + Mycoplasma hominis
- Trichomoniasis
- Cervix npl.(if suspected, send pat. for VIA/VILI (visual inspection acid/visual inspection Lugol) and if tumor verified by palpation or through speculum: histology necessary)

- Foreign body (in smaller girls)

 Treatment:

- Metronidazole 2 g single dose (in pregnancy Metronidazol 400 mg BD orally for 7 days). Try to avoid this treatment until week 20 in pregnancy because of increased risk for abortion. If possible use of e.g. Clindamycin Creme vaginally (OD 5g 2%) for 7 days or Metronidazol 1 g intravaginally OD for 2 days (not for breastfeeding mothers).
- **Plus**
- Clotrimazole vaginal pessary 500 mg single dose or 200 mg OD in the evenings for 3 days

Lower abdominal pain (women)

 Differential diagnosis:

- Emergencies (if rebound tenderness or guarding: refer to hospital):
  - » Appendicitis
  - » Ectopic pregnancy
  - » Pelvic abscess
- STD e.g.
  - » Gonorrhoea
  - » Chlamydial infection
  - » Infection with anaerobic bacteria
- Gynaecological referral of patients with:
  - Pregnancy
  - Delayed last menstrual period
  - Recent delivery or abortion
  - Menorrhagia
  - Fever
- Treatment for suspected STD:
  - Ciprofloxacin 500 mg single dose **plus**
  - Doxycycline 100 mg bid for 2 weeks **plus**
  - Metronidazole 400 mg bid for 2 weeks
  - Review after 3 days; without improvement: refer to hospital.

Scrotal swelling:

 Differential diagnosis:

- Under 35 years of age, sexually active: STD e.g.
  - » Gonorrhoea
  - » Chlamydial infection (with discharge)
- Over 35 years of age:
  - » Other infection of testis or epididymis e.g. due to E. coli, Klebsiella, Pseudomonas, TB etc.
- Prepubertal:
  - » Infection with E. coli, Pseudomonas
  - » Mumps
- Testicular torsion: sudden onset of scrotal pain (refer for surgery- emergency!)
- Trauma
- Tumor

 Treatment: Suspected STD: treat for gonorrhoea:

- Ciprofloxacin 500 mg single dose plus
- Doxycycline 100 mg bid for 7 days or
- Azithromycin 1 g single dose

#### Inguinal bubo:

(Swollen inguinal or femoral lymph nodes, possibly fluctuant)

 Differential diagnosis:

- Lymphogranuloma venereum (LGV)
- Chancroid
- Non-STD (local infection of lower limbs, tuberculosis)

 Treatment:

- Ciprofloxacin 500 mg bid for 3 days or
- Doxycycline 100 mg bid for 2 weeks or
- Erythromycin 500 mg qid for 2 weeks

#### Genital ulcers:

 Differential diagnosis:

- Syphilis
- Chancroid (Haemophilus ducreyi)
- Granuloma inguinale

- Lymphogranuloma venereum (LGV) ( chronic chlamydia infection)
- Genital herpes

**Note:**

If patients present with genital ulcer it is very important to establish a working diagnosis and treat according to main symptoms  
If there is no improvement after 7 days refer for investigations.

 Treatment:

- Suspected primary or secondary syphilis:
  - » Benzathine Benzyl Penicillin 2.4 million units (2 x 1.2 million units) IM single dose **or**
  - » With allergy against penicillin and not pregnant:
    - » Doxycycline 100 mg PO bid for 2 weeks
    - » or Azithromycin 2g SD
  - » With allergy against penicillin and pregnant:
    - » Erythromycin 500 mg PO qid for 2 weeks
  - » Suspected late syphilis (more than 2 years of infection):
    - » Benzathine Benzyl Penicillin 2.4 million units IM once weekly for 3 weeks **or**
- With allergy against penicillin and **not** pregnant:
  - » Doxycycline 100 mg PO bid for 30 days
- With allergy against penicillin and pregnant:
  - » Erythromycin 500 mg PO qid for 30 days
- Suspected chancroid (painful ulcers):
  - » Ceftriaxon 250 mg IM, SD **or**
  - » Erythromycin 500 mg qid for 7 days **or**
  - » Azithromycin 2 g single dose
- Suspected granuloma inguinale (painless ulcers) **add instead:**
  - Azithromycin 1 g initially, then 500mg OD x 3 weeks or
  - Doxycycline 100 mg bid x 3 weeks
- Suspected LGV
  - Doxycycline 100mg BD x 2 weeks or
  - Erythromycin 500 QID x 2 weeks
- If no improvement **suspect** genital herpes and **give:**
  - Aciclovir 400 mg tid for 7 days



## Prevention

- Education and awareness of STI, Use of condoms, circumcision, safer sex and reduced partner change, suppression therapy of HIV

## SYPHILIS

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### Epidemiology

- High seroprevalence in developing countries, esp. in Africa (50%), South America (10%), Asia (5-10%)
- Primary chancre: often not recognized; resolves spontaneously



### Cause

- *Treponema pallidum* (spirochaetes)



### Symptoms

#### Primary syphilis

- Incubation period: 2-3 weeks; infective stage of disease
- Painless, indurated moist papule with clean base and raised edge (primary chancre)
- Mainly on the glans, foreskin, shaft of penis
- Diagnosis often missed in women (most common on the cervix, occasionally on the labia)
- Inguinal lymphadenopathy (hard, painless)
- After 4-6 weeks: painless ulcer, resolving over several weeks

#### Secondary syphilis

- Infective stage; 2-3 months after infection
- Non-itching macular, papular or pustular rash, often desquamating; esp. on palms, soles; occasionally whitish areas on mucosa of mouth, vagina, penis
- Generalized lymphadenopathy
- Condylomata lata in moist areas of the body
- Systemic illness with fever and malaise
- Alopecia
- Rarely meningism, optic neuritis
- Resolving after several weeks (in one third of cases; afterwards: latent stage; one third of patients: tertiary syphilis)

#### Tertiary syphilis

- Gumma: granulomatous lesions with local tissue destruction mainly affecting skin,

bones, mucous membranes (manifestation after 3-10 years)

- Cardiovascular disease (about 10%) with aneurysm of the ascending aorta, aortic valve disease, coronary ostial occlusion (30-40 years after infection)
- Disease of the central nervous system (about 6%) with ataxia, progressive paralysis, dementia (20-30 years after infection)

### Congenital syphilis

Congenitally infected children of mothers with primary or secondary syphilis, higher rate of stillbirth or neonatal death

- Rash with desquamation, esp. palms, soles
- Persistent nasal discharge
- Anaemia, hepatosplenomegaly
- Periostitis of long bones with pseudoparalysis
- Later in life (> 6 years): Hutchinson's trias: keratitis, dental abnormalities, sensory deafness



### Diagnosis

#### Primary syphilis

- Dark field microscopy: spirochaetes
- Serology negative

#### Secondary syphilis

- TPHA (T. pallidum haemagglutination): specific test, used for screening
- FTA (fluorescent treponemal antibodies): for confirmation of diagnosis
- VDRL (veneral disease reference laboratory): nonspecific; used to monitor response to treatment



### Differential Diagnosis

Differential diagnosis/syndromic approach plus therapy for

### **Genital ulcers** - Differential Diagnosis

- Syphilis
- Chancroid (*Haemophilus ducreyi*)
- Granuloma inguinale
- Lymphogranuloma venereum (LGV)
- Genital herpes

**Note:**

If patients present with genital ulcer it is very important to establish a working diagnosis and treat according to main symptoms.

If there is no improvement after 7 days refer for investigations.

 Treatment:

- Suspected primary or secondary syphilis:
    - Benzathine Benzyl Penicillin 2.4 million units (2 x 1.2 million units) IM single dose **or**
    - with allergy against penicillin and **not** pregnant:
      - » Doxycycline 100 mg PO bid for 2 weeks
    - with allergy against penicillin and pregnant:
      - » Erythromycin 500 mg PO qid for 2 weeks
  - Suspected late syphilis (more than 2 years of infection):
    - Benzathine Benzyl Penicillin 2.4 million units IM once weekly for 3 weeks **or**
    - with allergy against penicillin and **not** pregnant:
      - » Doxycycline 100 mg PO bid for 30 days
    - with allergy against penicillin and pregnant:
      - » Erythromycin 500 mg PO qid for 30 days
- Plus**
- Suspected Chancroid:
    - Ciprofloxacin 500 mg bid for 3 days **or**
    - Erythromycin 500 mg qid for 7 days **or**
    - Azithromycin 1 g single dose
  - Suspected Granuloma inguinale (causative agent: *Klebsiella granulomatis*) **add instead**
    - Azithromycin 1 g single dose or
    - Doxycycline 100 mg bid or
    - Erythromycin 500 mg qid
  - Continue treatment until lesions are completely epithelized.
  - If no improvement suspect genital Herpes and give
    - Aciclovir 400 mg tid for 7 days

 Therapy

- Syphilis in adults:
  - Suspected primary or secondary syphilis:
    - Benzathine Benzyl Penicillin 2.4 million units (2 x 1.2 million units) IM single

- dose or
  - with allergy against penicillin and not pregnant:
    - » Doxycycline 100 mg PO bid for 2 weeks
  - with allergy against penicillin and pregnant:
    - » Erythromycin 500 mg PO qid for 2 weeks
  - Suspected late syphilis (more than 2 years of infection):
    - Benzathine Benzyl Penicillin 2.4 million units IM once weekly for 3 weeks or
  - with allergy against penicillin and not pregnant:
    - » Doxycycline 100 mg PO bid for 30 days
  - with allergy against penicillin and pregnant:
    - » Erythromycin 500 mg PO qid for 30 days
- Congenital syphilis:
  - Refer to hospital for treatment with antibiotics.
  - Investigate and treat mother and her sexual partner.

## TRICHOMONIASIS

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### Cause

- Trichomonas vaginalis



### Symptoms

- Males 90% asymptomatic, but infectious. May have balanitis, urethritis
- Females 50% asymptomatic:
  - Yellow-green frothy discharge, getting less in the later stages of the disease, sometimes foul smelling
  - Vulvar irritation; sometimes urethritis with dysuria



### Diagnosis

- Clinical picture
- Microscopy (if available) of vaginal fluid shows motile trichomonas



### Treatment

- See syndromic approach (STD)
- Metronidazol 2g SD

## URINARY TRACT INFECTION

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### Description

- Infections of bladder and urethra



### Concerned persons

- mainly in women and girls from 2 years of age



### Cause

- Commonly gram-negative bacteriae, often E. coli (70 – 95%)



### Symptoms

- Dysuria, lower abdominal pain
- Frequent urination
- Sometimes cloudy malodorous urine, occasionally haematuria
- Fever: often in children, rarely in adults
- Complications:
  - With ascending infection or spreading via bloodstream: fever, chilling, lower abdominal pain, back or lumbar pain, cloudy urine, often with blood
  - In children: often presenting with fever, vomiting or failure to thrive



### Diagnosis

- Dipstix: leucocytes positive, blood positive, nitrate positive
- Beware of false positive results when dipstix shows leucocyturia in women: clinical picture must be taken into consideration.



### Differential Diagnosis

- With recurrent, not-antibiotic-respondend symptoms: think of schistosomiasis, genitourinary tuberculosis, lithiasis, gonorrhoea.



### Therapy

- Increase fluid intake.
- Ibuprofen
- Acute uncomplicated cystitis:
  - Adults: Nitrofurantoin 3x100mg 5 days
  - Pregnant women:
    - » Amoxicillin 500 mg tid for 7 days or Fosfomycin or Cefixime (if available)
    - » Children/girls >2 years: Cefixime 8mg/kg OD 3 days or Amoxiclav 12.5mg/kg

BD for 3 days

- Acute complicated cystitis, acute pyelonephritis:
  - Adults: antibiotics for 7 (-10) days
    - » Nitrofurantoin 3x100mg 5days or, if available, Fosfomycin 3g SD or Cefixim BD 5d
    - » Cotrimoxazole 960 mg (160 mg TMP + 800 mg SMZ) bid
    - » Avoid Fluoroquinolone e.g. Ciprofloxacin both in pregnancy and in TB-endemic areas. Beware of muscolotendinal side effects; reserve this drug for STI and severe illnesses or treatment failures.
  - Children > 2 months:
    - » Cotrimoxazole 8 mg/kg TMP + 40 mg SMZ in 2 divided doses for 7 days **or**
    - » Cefuroxime 30 mg/kg in 2 divided doses for 7 days
  - Infants < 2 months:
    - » Refer to hospital (risk of renal complications).
  - Pregnant women:
    - » Refer to hospital

## VULVOVAGINAL CANDIDIASIS

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### Cause

- Candida albicans

### Symptoms

- Pruritus of vulva, vagina
- Vaginal discharge (whitish)

### Treatment

- See syndromic approach (STD)
  - Clotrimazole vaginal pessary 500 mg single dose or 200 mg OD in the evenings for 3 days

## ANTENATAL CARE / POSTNATAL CARE

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### Description

- In developing countries antenatal care aims to minimize complications which threaten life and health of pregnant women.
- In Africa: 700 maternal deaths due to pregnancy and delivery per 100 000 live births.
- In Bangladesh 40% of teenage pregnancies have complications (e.g. pregnancy-induced hypertension, eclampsia), in industrialized nations 1%.
- In developing countries nearly all women are anemic before getting pregnant; in 50% of pregnant women the hemoglobin is less than 8.5 g%.
- In some projects we have antenatal programs with standardized checks which have to be performed by the doctors; in other projects we refer to official programs.



### Therapy

#### Antenatal Checks

- Time of antenatal check-up:
  - WHO recommendations:
    - » With uncomplicated pregnancies: 4 check-ups during pregnancy (8- weekly intervals):
      - » 9-13. week (to estimate date of delivery)
      - » 18-22. week
      - » 28-32. week
      - » On the estimated date of delivery
- History:
  - Past/present medical history: diseases leading to complications during pregnancy
  - Gynecological/obstetric history (!): problems during previous pregnancies and deliveries, e.g. stillbirth, PIH (pregnancy induced hypertension), pre- and eclampsia, APH, PPH (ante- or post-partum-hemorrhage), previous C/S (Caesarian section) (assessment of risk)
- Estimation of date of delivery:
  - 1st day of last period plus 7 days minus 3 months
- Abdominal palpation:
  - Height of fundus
  - Try to find out how the baby is lying.
  - All women should be encouraged to deliver in a hospital, more so if the baby presents other than cephalic presentation
- Weight check:

- Usual weight gain during pregnancy: 8-10 kg
- Risk of insufficient weight gain due to malnutrition and poverty
- Sudden weight gain due to generalized edema: sign of complications (eclampsia – here more facial edema in addition to lower extremities)!
- Fetal movements:
  - Only 40% of fetal movements (“kicks”) felt by mother
  - Primipara: first fetal movements felt at 20 weeks’ gestation
  - Multipara: first fetal movements felt at 18 weeks’ gestation
  - Reduction of fetal kicks below 5 per day: start Daily Fetal Kick Count (DFKC):
    - » Mother counts fetal kicks starting at the same time every morning recording starting time and end of counting; count can be stopped after 10 kicks.
    - » Short version: mother counts fetal kicks over 3 hours, then multiplies number by 4.
    - » Normal pregnancy: more than 10 kicks in 12 hours
    - » Pathological (sign of placental insufficiency): less than 10 fetal movements in 12 hours; refer to gynecologist
- Urinalysis (dipstick):
  - Proteinuria:
    - » Pre-eclampsia: > 0.3 g/24 hours in urine (dipstick: ++)
    - » Severe pre-eclampsia: > 0.5 g/24 hours in urine (dipstick: +++)
  - Bacteriuria:
    - » Higher risk of cystitis or pyelonephritis in pregnancy
    - » Important: screening of asymptomatic women for leucocytes, blood and nitrate in the urine and subsequent treatment of women with positive results
  - Glycosuria:
    - » Possible sign of gestational diabetes (sensitivity 30%)
    - » If pregnant woman has family history of diabetes mellitus, delivered babies with high birth weight (> 4.5 kg) in the past or if diabetes mellitus is suspected: check blood glucose; arrange oral glucose tolerance test (if woman is seen during our own antenatal checks, otherwise refer).
- Blood pressure check:
  - Hypertension (systolic  $\geq$  160 mmHg, diastolic  $\geq$  100 mmHg)
    - » Treatment with methyldopa: start with 250 mg BID, increase if necessary (maximum 2 (3) g daily dosage). Careful: a hypotensive pressure will lead to a decrease in placenta perfusion!
  - Hypotension (systolic < 100 mmHg, diastolic < 60 mmHg)
    - » Can occur when patient is lying on the back (pressure of uterus on veins and vena cava).

- » Advice to lie on left side, increase fluid intake.
- » Ask for danger signs e.g. pain, bleeding; refer if necessary.
- Give iron and folic acid:
  - Elementary iron: 60 mg OD plus folic acid 0.8 mg OD during the whole pregnancy
  - Adjust dosage according to available iron preparation, (e.g. ferrous sulphate : elementary iron 3 : 1).
- Immunization status: complete tetanus immunization if necessary to prevent neonatal tetanus.
- Advice to use iodized salt
- According to availability and country guidelines, think about
  - **HIV testing**, if the mother is not known as HIV positive already
  - Blood group, Rhesus – in case of Rh negative – Anti D prophylaxis in pregnancy and after delivery?
  - VDRL – if positive treatment of mother with Depot-Penicillin 2 Mio IU i.m., partner testing and therapy
  - HBsAg – if positive simultaneous vaccination of the baby after delivery

### **Every pregnant woman should be encouraged to deliver in a hospital!**

If possible talk about the importance of breast-feeding and F.P. after delivery to achieve spacing (= time of 2 years before next delivery).

## ANTEPARTUM HAEMORRHAGE

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### Description

Vaginal bleeding after the 28th week and before birth of the child

### Cause

Main causes: abruptio placentae, placenta praevia, ruptured uterus

### Symptoms

- Abruptio placentae:
  - Often without contractions
  - Blood loss can be concealed: the condition can be far more serious than assumed from the amount of blood actually seen!
  - Patient can be in pain.
  - Shock
- Placenta praevia:

- Previous medical history: often recurrent episodes of painless vaginal bleeding in pregnancy (esp. during the last 12 weeks)
- Severe haemorrhage during labour with dilatation of cervix
- Ruptured uterus:
  - Esp. in patients with previous medical history of caesarian section and with obstructed labour or after numerous pregnancies
  - Abdominal pain
  - Shock
  - Life threatening event for mother and baby

### Treatment

- Check blood pressure and heart rate.
- Set up IV infusion: large IV cannula (16 G); if in shock give Ringer's Lactate solution 1-3 litres IV; if available give gelafundin 30-40 mL/kg IV.
- Refer to hospital immediately

With antepartem haemorrhage:

**Never** perform a vaginal examination as this can cause severe bleeding.

**Always** refer to hospital as soon as possible!

## ECTOPIC PREGNANCY

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### Description

Egg implants outside the uterine cavity.

### Concerned persons

Responsible for about 7% of maternal deaths

### Cause

Increased risk after pelvic inflammatory infection, previous ectopic pregnancy, endometriosis, tubal surgery, IUD in situ

97%: implantation in tubes

### Symptoms

- Abdominal pain; may be mild (without peritonism) in subacute manifestation; can be severe in acute manifestation (acute abdomen with peritonism).
- Vaginal bleeding (dark or fresh) – often after about 8 weeks of amenorrhoea
- Collapse, shock (with pallor, tachycardia, low blood pressure)

- Occasionally shoulder tip pain
- adnexal mass may be palpable

#### Diagnosis

- Pregnancy test positive
- Ultrasound scan:
  - Tubal/abdominal mass
  - Empty uterus

Think of an ectopic pregnancy in:

- Fertile women with lower abdominal pain associated with continuous vaginal bleeding
- Fertile women with collapse
- Always take a gynaecological history.

#### Differential Diagnosis

- Twisted ovarian cyst (no amenorrhoea, no vaginal bleeding)
- Appendicitis (leucocytosis, fever)
- Perforated gastric/ duodenal ulcer

#### Treatment

- Set up IV infusion e.g. Ringer's Lactate solution
- Refer to hospital straight away

## MASTITIS

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#### Description

Breast inflammation in mostly breast-feeding women

#### Concerned persons

Mostly breast-feeding mothers

#### Epidemiology

worldwide

#### Cause

- Usually caused by staphylococci
- Predisposing factors: nipple erosion, poor emptying of breast

- Non-lactating women: think of other causes e.g. carcinoma

### Symptoms

- Sore, cracked nipple
- Part of the breast hot, red, swollen
- Lymphadenopathy, occasionally fever
- Occasionally abscess

### Treatment

Start as soon as possible to avoid abscess formation.

- Breastfeeding should be continued (shorter, but more often), unless there is a severe infection, baby should feed from affected breast first.
- Clean nipples with boiled cool water.
- Gently rub breast milk on the nipples after feeding.
- Severe infection: express breast milk for a few days.
- Antibiotics PO:
  - Cloxacillin 1000 mg TID
  - **or** if penicillin allergy: Erythromycin 500 mg qid
  - Duration of treatment: 7-10 days
- Cool compresses
- Abscess: trial of antibiotics; if no improvement: refer for or perform surgical intervention.

## POSTPARTUM HAEMORRHAGE

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### Description

- Excessive vaginal bleeding after delivery
- Blood loss difficult to assess as the blood is mixed with amniotic fluid and is lost in towels, linen etc.
- Normal blood loss: 200-300 mL; postpartum haemorrhage: > 500 mL

Dangerous, as situation can deteriorate rapidly!!

### Concerned persons

Women in childbed, especially in the first hours after delivery

### Epidemiology

Worldwide, but incidence increases where (esp.: unattended) home delivery is common

## Cause

Main causes: vaginal tear, cervical tear, placenta accreta, atonic uterus

## Symptoms

- Placenta accreta:
  - Placenta not separating from myometrium of uterus
- Atonic uterus
  - Inefficient uterine contraction/retraction after separation of placenta
  - Fundus soft, high (normally: uterus postpartum firm, fundus at the level of umbilicus)
  - Haemorrhage can be severe!

## Treatment

- Check blood pressure and heart rate.
- Set up IV infusion: large IV cannula (16 G); if in shock give Ringer's Lactate solution 1-3 litres IV; if available give gelafundin 30-40 mL/kg IV.
- Placenta accreta:
  - Give oxytocin 10 IU IV in 500 mL of Ringer's Lactate solution.
  - Send patient to hospital for manual removal of placenta
  - In desperate situations: perform manual removal on site
- Atonic uterus:
  - With patient lying on her back rub uterus gently with one hand: place fingers behind the fundus, thumb in front of the fundus.
  - Give oxytocin 10 IU IV in 500 mL of Ringer's Lactate solution.
  - If no success: **bimanual compression of uterus:**
    - » Right hand inserted into the vagina, formed into a fist and placed in anterior fornix of vagina: press against the anterior wall of the uterus.
    - » Left hand placed on abdomen behind the uterus: press downwards to press the posterior wall of the uterus against the anterior wall.
  - **Last resort: compression of aorta:**
    - » One fist pressing downward into the abdomen just above the umbilicus, slightly to the left.
    - » Other hand palpating femoral pulse: if still palpable compression is insufficient and further pressure needs to be applied until bleeding is controlled.

With postpartum haemorrhage:

Every patient **must** be sent to hospital immediately for further management.

## PRE-ECLAMPSIA

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### Description

One of the most serious complications in pregnancy with cardiovascular, neurological and metabolic symptoms



### Concerned persons

- Usually in the 2nd and 3rd trimester of pregnancy
- Mainly primigravidae and women >35 years affected



### Epidemiology

In industrialized countries: in 5-10% of pregnancies, higher incidence in developing countries



### Cause

The exact reasons are unknown, but nutrition, genetics, poor blood flow to the uterus seem to play a role



### Symptoms

- Oedema
- Proteinuria
- Hypertension
- Can progress to **eclampsia**:
  - Headache, visual disturbance
  - Confusion
  - Tonic-clonic seizures, coma
  - Renal failure, pulmonary oedema

#### **Note:**

With vomiting, abdominal pain and tenderness over the liver: think of HELLP-syndrome (**h**aemolysis, **e**levated liver enzymes, **l**ow **p**latelets.  
Refer to hospital immediately (life-threatening condition).



### Treatment

- Long term treatment:
  - Methyldopa PO: initially 250 mg bid - tid, increase gradually at intervals of at last 2 days prn (up to 3 g/day); usual dose: 250-1000 mg/day in 2 divided doses
  - Additionally, if necessary: metoprolol and retarded nifedipin can be given

- Emergency treatment (severe pre-eclampsia):
  - Hydralazine 5 mg diluted in 10 mL 0.9% normal saline IV every 20 minutes (maximum 30 mg; side effects: tachycardia, headache) **or**
  - Nifedipine caps 5 mg PO, repeat after 20 minutes if required (avoid first trimester)
- Refer to hospital for intensive treatment.
- Magnesium sulphate: although used commonly in developed countries it does not seem to be an option in the field due to risk of side effects and difficulties in administration.
- Criteria for admission to hospital:
  - Hypertension: systolic BP  $\geq$  160 mmHg or diastolic BP  $\geq$  100 mmHg
  - Proteinuria and weight gain  $>$  1 kg/week in the 3rd trimester
  - Suspected HELLP-syndrome
  - Reduced fetal kicks
  - Suspected IUGR (intrauterine growth retardation)
  - Additional findings: pre-existing maternal illness (renal, diabetes mellitus), multiple pregnancy, early gestational age (before 34. week), oligohydramnios



#### Prevention

- Close supervision of pregnant women in antenatal care programmes
- ASS 110 mg/d from 12th to 36th week reduces pre-eclampsia incidence



## EPILEPSY

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### Description

- Seizure: due to paroxysmal discharge of cerebral neurones
- Epilepsy: should only be diagnosed after 2 seizures



### Cause

- Hereditary: low seizure threshold
- Brain disorders e.g. after perinatal hypoxaemia
- Acute infections or trauma to the central nervous system e.g. encephalitis, meningitis, haemorrhage, abscess, cysticercosis, cerebral malaria
- Drugs, alcohol or withdrawal of drugs; poisoning
- Metabolic disorders e.g. hypoglycaemia, uraemia, dehydration etc.
- Intracranial tumors
- Pyrexia febrile convulsions in children



### Symptoms

- Classification:
  - Generalized seizures (grand mal seizures; neuronal discharge involving both hemispheres, generalized symptoms):
    - » Primary or secondarily generalized (following partial seizure)
    - » Mainly idiopathic, but can be hereditary or due to brain disorders
    - » Preceding aura in secondarily generalized seizures
    - » Sudden loss of consciousness with tonic/clonic movements of limbs, lasting for several minutes, then post-ictal confusion or drowsiness
    - » Often with tongue bite and/or incontinence of urine or faeces
    - » Absence seizures (petit mal):
      - » Childhood disorder, may develop into grand mal fits in adult life
      - » Sudden onset, child stops all activity, looks vacant for a few seconds, then resumes previous activity.
  - Partial seizures (neuronal discharge involving part of the brain; focal symptoms):
    - » Simple partial seizure:
      - » Consciousness not impaired
      - » Motor, sensory or autonomic disturbance depending on site of origin in brain
    - » Complex partial seizure:
      - » With aura
      - » Consciousness impaired
      - » Verbal or motor automatisms depending on area of brain involved

- Febrile seizures (convulsions):
  - » Age: 6 months to 5 years
  - » Tonic-clonic seizure, focal seizure
  - » Often less than 15 minutes
  - » No neurological deficit



### Diagnosis

- Detailed history including family history and detailed description of fits
- Temperature
- Blood sugar
- In rare cases: EEG, CT-scan



### Differential Diagnosis

- Vasovagal syncope: occasionally accompanied by rhythmic jerks; no post-ictal drowsiness
- Chilling: tremor, no loss of consciousness, no postictal phase
- Underlying causes e.g. meningitis, encephalitis, malaria, tuberculosis, parasitic disease e.g. schistosomiasis, cysticercosis etc.



### Therapy

- Emergency treatment:
  - Keep calm – usually a seizure is not a life-threatening event and resolves spontaneously.
  - Prevent patient from injuring himself.
  - Secure airway, if possible recovery position.
  - Give oxygen if available.

Treatment should be started as monotherapy! The dose should be augmented slowly starting from a low dose to the maximum dose (and/or reaching of side effects). Only if seizure-free periods cannot be reached with monotherapy, you might change to a different medication or try a combination of different medicines. Medication needs to be taken regularly!

Our projects provide the following medicines:

- Generalized seizures and absences:
  - Valproat 20 mg/kg body weight (1st choice)
  - Phenobarbital up to 5 mg/kg (preferably for babies) (2nd choice)
- Focal seizures and focal convulsions with generalization
  - Carbamazepin 20 mg/kg body weight
  - If not sufficient (= seizures don't stop), add Phenytoin 2 mg/kg or Phenobarbital 2

mg/kg

- Valproat 20 mg/kg (> age 6 yrs) or Phenytoin 5 mg/kg (2nd choice)
- Levetiracetam, if available, is a rather safe epileptic medication. Controls of blood levels are not necessary, only few side effects and effective in case of generalized and focal seizures. Dose: 10-30 mg/kg body weight/day. Makes sense as 2nd choice medication in case of therapy failure.

Side effects:

- Sodium valproate:
  - Hair loss
  - Teratogenic: avoid in the 1st trimester: increased risk of neural tube defects
  - Rarely hepatic failure
- Carbamazepine:
  - Allergic reactions, hair loss
  - Teratogenic: avoid in the 1st trimester: increased risk of neural tube defects; adequate folate supplements advised, therefore start folic acid prior to pregnancy.
  - Interactions with theophylline, digoxin, erythromycin, furosemide, phenobarbital
  - Storage: tablets must be stored in a dry place.
- Phenobarbital:
  - Sedation, esp. in adults
  - Behavioural disturbances, hyperactivity (children)
  - Risk of rebound seizures on withdrawal
  - Pregnancy: risk of congenital malformations
  - Interactions with carbamazepine (reduced plasma concentration), phenytoin, sodium valproate
  - Hepatitis, cholestasis
- Phenytoin:
  - Small increase in dosage may produce large rise in plasma concentration
  - Acne, hirsutism, gingival hyperplasia
  - Megaloblastic anemia (treatment with folic acid)
  - Rarely: hepatotoxicity
  - Congenital malformations
  - Interactions with phenobarbital, digoxin, furosemide, cimetidine, theophylline, vitamin D (increased requirement)
- Withdrawal of medication:
  - may be attempted after 2-3 years without seizures and normal EEG.
  - Avoid abrupt withdrawal: risk of rebound seizures.
  - Important: gradual reduction of medication over several weeks (up to months)

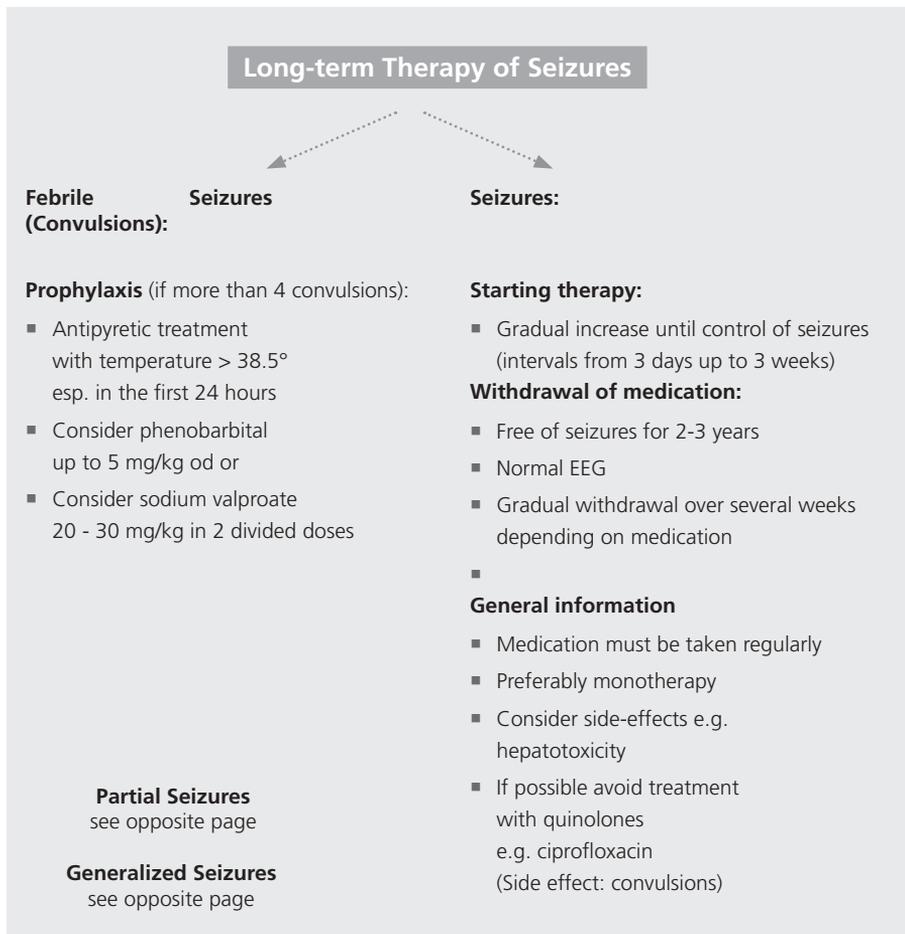
- In patients with several drugs: gradual withdrawal of one drug at a time

#### Prevention

- Avoid alcohol, lack of sleep
- Drug treatment only in cooperative patients (convulsions may be caused by sudden withdrawal of anticonvulsants) and frequent seizures
- Febrile convulsions: paracetamol and tepid sponging with increasing temperature

#### Important to remember:

- Taking a detailed history is of utmost importance.
- Think of epileptic fit in a patient with sudden loss of consciousness lasting seconds to minutes, incontinence and subsequent disorientation or coma.



**Partial Seizures:****First line treatment:**

- Carbamazepine 20 mg/kg in two divided doses\*

**Second line treatment:**

Children > 6 yrs:

- Sodium valproate 20 mg/kg in two divided doses or
- Phenytoin 5mg/kg in two divided doses

\* if still not controlled add:

- Phenobarbital up to 5 mg/kg od

**Generalized Seizures:****First line treatment:**

- Sodium valproate 20 mg/kg in two divided doses\* or

**Second line treatment:**

- Phenobarbital up to 5 mg/kg OD

**Secondarily generalized Seizures:**

Children > 6 yrs:

- if grand mal while asleep:  
Carbamazepine 20 mg/kg in two divided doses\*



## CORONARY ARTERY DISEASE (CAD)

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### Description

- Main cause of death in developed countries, less common in our projects but getting more common in developing countries due to increasing urbanization
- 2 types:
  - Acute coronary syndrome
  - Stable coronary heart disease



### Concerned persons

- Men affected at an earlier age than women



### Symptoms

- Acute coronary syndrome:
  - Acute myocardial infarction:
    - » Chest pain for longer than 30 minutes, intense, often with fear of dying, not relieved by nitrates or rest
    - » Dyspnoea, tachypnoea,
    - » Pallor, sweating, distress, nausea, vomiting
    - » Complications: arrhythmias, congestive cardiac failure, cardio-genic shock
- Stable coronary artery disease:
  - Angina:
    - » Precipitated by exertion, stress etc. with recurrent (sometimes crushing) chest pain, radiating to neck, jaw or arms
    - » Dyspnoea on exertion
    - » Relieved by rest or nitrates
- Risk factors:
  - Smoking
  - Diabetes mellitus (high risk group)
  - Hypertension
  - Family history: myocardial infarct, stroke
  - Hypercholesterolemia



### Diagnosis

- History (?risk factor, predisposing illnesses, precipitating factors, duration, family history)
- ECG
- Cardiac enzymes e.g. troponin (usually not available in the projects)

**Note:**

ECGs are rarely relevant in patients with stable angina; with suspected myocardial infarction send patient to hospital straight away.

**Differential Diagnosis**

- Cardiovascular disease: perimyocarditis, arrhythmias (?palpitations), heart valve disease (aortic stenosis), aortic dissection
- Pulmonary disease: pulmonary embolism, pleuritis, pneumothorax
- Musculoskeletal disease: rib fracture, muscular strain, thoracic nerve compression
- Gastrointestinal disease: oesophagitis, gastric or duodenal ulcer, pancreatitis, biliary colic
- Other diseases: thoracic varicella zoster, rib tumor

**Therapy**

- Acute coronary syndrome:
  - Try to calm the patient.
  - Analgesics as available
    - » Morphine not available in our projects; therefore give
    - » Tramadol hydrochloride 2 mg/kg IV
  - Oxygen via nasal prongs
  - Glycerol trinitrate 0.5 mg sublingual (caps) or 1-2 puffs of spray
  - Acetylsalicylic acid 600 mg PO stat, then continue at 150 mg OD
  - $\beta$ -blocker e.g. Metoprolol 100-200 mg od (contraindicated in patients with bronchial asthma, COPD, bradycardia, heart failure, hypotension)
  - Treat complications e.g. heart failure (f.e. Furosemide 40 mg IV stat).
  - Refer to hospital for observation and further treatment.
- Stable coronary heart disease:
  - Acetylsalicylic acid 100 or 75 mg od
  - Angina:
    - » Glycerol trinitrate SL prn
    - » Metoprolol 100-200 mg od (consider contraindications!)
  - Advice to stop smoking
  - Treat underlying diseases e.g. hypertension, diabetes mellitus.

**Important to remember:**

- Pain in the chest is a common complaint, but in most cases not connected to the heart (e.g. short stabbing pain, pain relieved by moving, pain in different locations of the chest, pain related to breathing).

- Taking a proper history, examining the patient properly and making a diagnosis is of utmost importance in the treatment of chest pain.

## DIABETES MELLITUS

### Description

2 types of diabetes mellitus:

	<b>Type I Diabetes mellitus</b>	<b>Type II Diabetes mellitus</b>
Frequency (% of population worldwide)	< 10%	> 90%
Cause	Autoimmune disease, loss of pancreatic beta cells	Insulin secretory defect, insulin resistance
Age of onset	Mainly affected: children, young people	> 40 years
Onset	Abrupt	Slow
Constitution	Lean, weight loss	Obese, increasing weight
Ketoacidosis	Common	Rare
Sulfonylureas	Not effective	Effective

### Concerned persons

- Prevalence dependent on age
- Increasing in developing countries due to population growth and urbanization and increasing prevalence of obesity and physical inactivity
- For gestational diabetes: Glucose intolerance, first onset during pregnancy.
- Increased risk of developing type II diabetes mellitus after delivery

### Symptoms

- Polyuria, polydipsia
  - Weight loss, lethargy
  - Dehydration, with visual disturbance and leg cramps
  - Pruritus, skin infections (bacterial, fungal)
  - Delayed or failing healing of wounds
  - Untreated: coma, death
  - Complications:

- » Peripheral neuropathy e.g. bilateral lower extremity sensory neuropathy, diabetic foot with painless ulcers
- » Microangiopathy e.g. retinopathy, nephropathy
- » Macroangiopathy: myocardial infarct, stroke
- » Often associated with hypertension

### Diagnosis

- Random blood sugar: > 200 mg/dl (11.1 mmol/l), along with symptoms of Diabetes
  - Fasting glucose: > 125 mg/dl (7.0 mmol/l) and / or postprandial sugar > 200 mg/dl
  - Glucosuria
  - In some cases, urine dipstick positive for ketones

### Differential Diagnosis

- fatigue and weight gain: hypothyroidism and other endocrinological diseases
  - fatigue: anemia, iron deficiency, hypothyroidism, neoplasmas, depression, infections, encephalopathies, malnutrition
  - neuropathy: folic acid deficiency, alcoholism, vitamin deficiencies etc.

### Therapy

Every patient with diabetes mellitus must be referred to a diabetic clinic if at all possible; regular check-ups are of utmost importance, esp. in patients on insulin and sulfonylureas.

- **Type II** Diabetes mellitus:
  - First line treatment:
    - » Advice regarding diet, exercise and weight reduction (avoid food containing sugar; advice to eat several small meals and to avoid fat)
  - Second line treatment: oral medication in cooperative patients:
    - » Metformin (for insulin resistance):
      - » Initially 500 mg OD (up to 1000 mg bid)
      - » Contra-indications: renal impairment, cardiac failure, respiratory failure, hepatic impairment; has to be stopped in any severe illness (e.g. tuberculosis, pneumonia or dehydration), prior to investigations with x-ray contrast media or prior to general anaesthesia
      - » Side-effects: nausea, vomiting (esp. with too high initial dosages) rarely: lactic acidosis
      - » Note: problem with fasting periods during Ramadan (medication to be taken at night)
      - » Advantage: no risk of hypoglycemia

- » Glibenclamide (or newer sulfonylurea), stimulation of beta cells:
- » Dosage: 1.75 mg (up to 10.5 mg); give 2/3 of medication in the morning, 1/3 in the evening.
- » To be taken before meals
- » Side effect: hypoglycemia, esp. with irregular food intake
- » Contraindicated in pregnancy
- **Type I** Diabetes mellitus:
  - Mixed insulin SC:
    - » Give 2/3 in the morning, 1/3 at night
    - » Side-effect: hypoglycemia, esp. with irregular food intake
  - **Only** to be given in **rare** cases:
    - » Cooperative patient
    - » Education of patient and close follow-up e.g. in diabetic clinic or with local coordinator
    - » Problems:
      - » No home glucose testing
      - » Storage (no refrigerator)
  - Metformin is not indicated in Typ-1 Diabetes
- hypoglycemia:
  - Side-effect in treatment with sulfonylureas (prolonged hypoglycemia) and insulin
  - Clinical manifestations:
    - » Hunger, nausea, restlessness, tremor
    - » Sweating, tachycardia
    - » Seizures, coma
  - Treatment:
    - » Mild hypoglycemia, conscious patient:
      - » Give sugary drink e.g. Coca-Cola.
      - » Then give long-acting carbohydrates e.g. biscuits, bread.
      - » Recheck blood sugar prior to discharge of patient.
      - » Rule out triggers like malaria, intoxications, quinine medication, liver failure
    - » Severe hypoglycemia, semi- or unconscious patient:
      - » 40% glucose IV: 40-100 mL stat (with frequent blood glucose checks), **then**
      - » 5% glucose IV (up to blood sugar of 200 mg/dl)
      - » Refer to hospital.

Follow up of all diabetes patients:

- History: ?problems ?hypoglycemia
  - BM-stix or blood glucose

- Blood pressure check
- Urine dipstick ?albumin (rule out UTI)
- Serum creatinine with possible nephropathy
- Check feet (pulses, sores, nails), advice to wear slippers or shoes for protection.
- Education and referral to diabetes clinic

Gestational diabetes:

Therapy (only by specialist)

- Diet advice (e.g. avoidance of sugar, several small meals)
  - Insulin SC
  - Metformin PO (only studies with patients in 2nd and 3rd trimester; can be given in the first trimester if benefit outweighs the risk; not known to be teratogenic in animals)
  - advise for close follow up of pregnancy, body weight, blood pressure to monitor the risk of additional preeclampsia and to visit antenatal clinics regularly



Prevention

- There are no known ways to prevent Type-1 diabetes mellitus
  - To prevent Type-2 and gestational diabetes it is advisable to stick to a fat and sugar reduced diet, to avoid obesity, have regular daily physical exercise of 30 minutes minimum, to give up smoking.

## DISEASES OF THYROID GLAND

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Description

Thyroid diseases occur in all parts of the world, especially where the soil and thus the food contain too little iodine. iodine deficiency leads to suboptimal brain maturation in childhood and to strum formation in adulthood.

The most common thyroid diseases are:

- Struma (goitre formation)
- hypothyroidism
- hyperthyroidism
- thyroiditis
- autoimmune diseases (Hashimoto thyroiditis, Basedow disease, de Quervain)
- benign thyroid nodules (adenomas)
- Thyroid cancer (rare cancer, only about two percent of all cancers)



### Concerned persons

The euthyroid struma occurs more frequently in iodine deficiency areas. Children and pregnant women are particularly endangered by iodine deficiency.

Since the newborn in our project countries are not tested for hypothyroidism (Guthrie test), we also see cretinism, the severe form of hypothyroidism in children, still sporadically in our outpatient departments.



### Epidemiology

More than one billion people worldwide live in areas that are not sufficiently supplied with iodine. These include the whole of India, the Philippines, South America and Central Africa. In areas that are undersupplied with iodine, nodular thyroid diseases are more common, while autoimmune thyroid diseases are more common in adequately supplied areas.



### Cause

In addition to genetic factors such as age, sex and habits (smoking), an undersupply of iodine is the most important cause of thyroid disease.

Hyperthyroidism develops in the goiter

- through the independence of tissue areas that are not controlled by TSH from the pituitary gland
- or autoimmune processes in the thyroid gland (Graves' disease).
- Increasingly, hyperthyroidism also occurs as a result of an excess of iodine in contrast medium applications during radiological examinations.

The development of hypothyroidism is based on iodine deficiency and/or autoimmune inflammation of the thyroid gland.



### Symptoms

For mechanical reasons, goitre leads to difficulty swallowing and shortness of breath when the size of the organ increases accordingly.

Hyperthyroidism and hypothyroidism are characterized by a typical symptom pattern, which can, however, also occur oligosymptomatically in old age and then occasionally be misinterpreted.

**symptoms of hyperthyroidism:**

- tremor
- Tachycardia / Atrial fibrillation
- Sweating, heat intolerance
- weight loss
- diarrhoea
- hair loss
- nervousness
- sleeplessness
- constant hunger
- Exophthalmos (in the Basedow's goiter)

**symptoms of hypothyroidism:**

- Depressive mood
- constipation
- weight gain
- Psychomotor deceleration
- Myxedema (face, trunk, legs)
- bradycardia, enlargement of the heart, low blood pressure
- harsh voice
- Cycle disorders in women
- In children: severe developmental disorders (cretinism)

 **Diagnosis**

Clinical examination:

Palpation of the thyroid gland (also during swallowing), heart rate, examination for fine-beat tremor, search for edema.

blood tests (only those that have relevant consequences in the projects):

**in v.a. hypertyroidism:**

- TSH (at first diagnosis)
- fT4 (once before start of therapy and for follow-up under therapy)

**in v.a. hypothyroidism:**

- TSH (initial diagnosis and follow-up)
- fT4 is not required for clear clinical signs and increased TSH

 **Differential Diagnosis**

In order to distinguish malignant, autoimmunological and inflammatory processes as well as functional autonomies of the thyroid gland, ultrasound and scintigraphy may be necessary as further examination methods. Due to limited diagnostic and therapeutic resources in the projects of the German Doctors, this differential diagnosis is only considered if the drug treatment of thyroid diseases remains unsuccessful after 1 - 2 years. The long-term physician or the medical director of the German Doctors in Bonn decides on the use of the necessary measures depending on the special conditions in the individual projects.

 **Therapy**

An **euthyroid goiter** without clinical signs of hyper- or hypothyroidism and without local symptoms is not treated with medication in the project countries. If drug treatment is considered to reduce the size of the goiter in the case of local symptoms, this is

done with increased iodine intake, easiest with food and via iodised table salt. In some project countries, such as Kenya, the table salt is generally iodised, in other project countries iodised table salt is at least available. Patients should be made aware of the possibility of purchasing this salt.

Pregnant women in iodine deficiency areas and/or with goiter should be strongly advised to buy iodised table salt.

Long-term treatment of each struma with L-thyroxine is not recommended, as this would result in faster growth due to thyroid-internal iodine deficiency once the substitution is complete. Struma patients with local symptoms are treated with iodine-thyroxine (150 µg iodine and 75 µg L-thyroxine) for up to 2 years with the aim of volume reduction. After 2 years, further volume reduction is no longer to be expected, but after that sufficient iodine intake must be ensured.

The treatment of **Hyperthyroidism** is not be started without hormone tests for confirmation of diagnosis.

- Therapeutic:
  - Carbimazole:
    - » Start with 30 mg OD (according to initial T4).
    - » Check **T4** after 4 weeks, then after 3 months and adjust treatment according to result (repeated checks of TSH not necessary as it takes a long time to adjust).
    - » Maintenance dose: 2.5-15 mg OD
    - » Side effect: agranulocytosis (1%); occurs suddenly: therefore check white cell count only in symptomatic patients (sore throat, fever, other signs of infection); stop treatment immediately.
  - Symptomatic (with tremor and tachycardia):
    - Metoprolol:
      - » Give 50-100 mg OD
      - » Improves tremor and tachycardia and reduces the conversion of T4 to T3.
      - » Adjust according to heart rate and blood pressure; if normal: stop.
  - Duration of treatment:
    - Graves' disease:
      - » Try to stop treatment after 12-18 months.
      - » In 50% remission after 12-18 months; if symptoms recur consider referral for operation (subtotal thyroidectomy).
    - Toxic adenoma: treatment life-long; consider referral for operation.

## Diagnosis and Therapy of Hyperthyroidism

### T4 normal

- subclinical hyperthyroidism
- Avoid iodine
- Observe

### T4 raised (>2 ng/dl)

- Clinical hyperthyroidism
- Treatment
  - Carbimazole 30 mg od
  - Consider Metoprolol ret. 50 mg od

After **4 weeks**: check **T4**

Adjust carbimazole dose (maintenance dose: 2,5-15 mg od)

Aim for normal values of T4

### + Arrange

**/when therapy unsuccessful for 1–2 years)**

Ultrasound scan of thyroid gland

- Nodules (toxic adenoma)
- Life-long treatment or operation
- Diffuse enlargement (Graves' disease)
  - Stop carbimazole After 12–18 months
  - observe

Without symptoms the increase in TSH > 4 and < 10 mU/l is not a manifest **hypothyroidism** and is not an indication for substitution treatment if fT4 is normal. Therefore, at TSH values > 4 and < 10 mU/l, a single fT4 determination should be performed if there are no symptoms. If the fT4 value is normal, there is no indication for treatment.

For the therapy of hypothyroidism, L-Thyroxine is available in the projects, which must be started in low doses (25 µg/d) in order to avoid possible cardiac side effects of the therapy. After a slow dose increase (approx. doubling of the dose every 2 weeks), the long-term dosage is between 75 and 150 µg/d, depending on the results of the TSH controls, which have to be carried out first after 8 weeks and then every 6-12 months. The aim of the therapy is to normalize the TSH.

A control examination of the fT4 values under treatment of hypothyroidism is only indicated if the TSH value is below the norm and if there is a clinical suspicion of substitution-related hyperthyroidism.



### Prevention

- Regular use of iodized salt e.g. in bread or added after cooking
  - Advice regarding food: increase consumption of seafood or seaweed (as most of the iodine is found in the water after cooking: prepare soup or sauces)
  - Avoid manioc or water it for one hour before preparing the meal.
- Patients with goitre should be checked at each consultation regarding heart rate, blood pressure and weight to avoid problems under therapy.

## HYPERTENSION

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### Description

- Increasing problem in developing countries due to improving living standards
- Risk factor for cardiac disease, stroke, renal failure and arteriosclerosis
- In pregnant patients: increased risk of abruption of placenta, eclampsia and premature labour



### Concerned persons

Hypertension can occur with increasing age. However, lifestyle also plays an important role in the risk of hypertension. Some of the most important risk factors for hypertension are:

- excessive salt intake
- overweight
- lack of exercise
- alcohol abuse
- smoking
- genetic component

Patients with type 2 diabetes also have high levels of hypertension (up to 60 %), which massively increases the risk of cardiovascular disease.



### Epidemiology

Around one billion people worldwide suffer from (often undiagnosed) hypertension. Two-thirds of all those affected live in countries with medium and low incomes. Hypertension is one of the most important risk factors for (fatal) cardiovascular diseases. 17 million people die each year from cardiovascular disease. 9.4 millions of these deaths can be directly attributed to hypertension.

## Diagnosis

- At least 3 consecutive readings with blood pressure of 150/90 mm Hg and higher over a period of several days
  - If hypertension is not responding to treatment: exclude secondary hypertension:
    - Creatinine, Sodium, Potassium
    - TSH

## Differential Diagnosis

- Chronic glomerulonephritis
- Chronic pyelonephritis
- cystic kidneys
- renal artery stenoses
- Conn syndrome
- Cushing's disease
- pheochromocytoma
- hyperthyroidism
- aortic coarctation

The following examination program is sufficient to clarify differential diagnostic questions, taking into account the limited resources in our projects:

- One-time RR measurement on arms and legs. When the blood pressure on the legs is lower than on the arms: Echocardiography, possibly Rx-Thorax (rib injuries detectable?)
- TSH, if lowered: fT4
- creatinine, potassium, sodium

The search for a renal artery stenosis, on the other hand, is not useful because the indication for interventional treatment is rarely given and is not available as a therapy option in our projects.

## Therapy

Borderline hypertension:

Drug treatment not indicated.

- Advise life style changes e.g. smoking cessation, weight reduction, reduction of alcohol intake, exercise, low salt diet, increased fruit and vegetable intake.

Medication necessary if non-drug treatment fails and RR > 150/90 mm Hg

In most cases medication must be taken life-long.

For practical reasons, the indication for antihypertensive treatment in our projects begins with values measured three times on different days above 150/90 mm Hg.

The following drugs are available in the projects for monitoring blood pressure with medication:

- Amlopidin (calcium antagonist)
- Bisoprolol and propranolol (beta blocker)
- Enalapril (ACE inhibitor)
- Hydrochlorothiazide (diuretic)
- Alpha-Methyldopa (in pregnancy)
- Hydralazine (in pregnancy)
- Furosemide and spironolactone in combination

In the case of essential hypertension, we usually start with enalapril. If normalisation of blood pressure cannot be achieved or if there are additional clinical signs of heart failure, the next drug to be used may be HCT because it significantly increases the effect of ACE inhibitors. However, if hypertension is caused by hyperthyroidism, a beta-blocker should be used as the first antihypertensive.

If the drugs described so far are not sufficient in combination to achieve normotensive blood pressure control, amlodipine and finally hydralazine can also be prescribed. If such a number of drugs is required, we have to expect considerable compliance problems in the long run. We can only counter this by constantly providing new information about the necessity of this permanent treatment and the fatal consequences of discontinuing therapy.

Often we are confronted with hypertension during pregnancy. Most of the antihypertensives available to us in the projects should not be prescribed during pregnancy. Alpha-methyldopa or hydralazine are the treatment of choice during pregnancy.

Avoid treatment with ACE-inhibitors in women of child-bearing age (risk of malformations).

Important to remember:

- During consultation it is important to decide whether the raised blood pressure is genuine or reactive e.g. induced by the visit to the doctor.
- At least 3 blood pressure readings on different days are necessary to make the diagnosis of hypertension.
- If hypertension is not responding to treatment exclude secondary hypertension (hyperthyroidism, renal hypertension). In the tropics 20-30% of hypertensive problems are due to renal disease.
- Patient compliance and continuity of treatment are of utmost importance. It is useless to treat patients for 3 weeks only.

Prevention:

To prevent hypertension, a whole range of measures exist. These include

- Heart healthy nutrition (DASH - Dietary Approaches to Stop Hypertension -recom-

mended by the WHO)

- weight loss
- salt reduction
- balanced exercise programme
- smoke stop
- hardly any to no alcohol consumption

In the life situation that many of the patients in the German Doctors' projects have to deal with, some of these recommendations seem to be difficult or even impossible to implement. Nevertheless, it is important to explain these lifestyle modifications to the patients again and again and to describe possibilities how they can be implemented (as simply as possible) in everyday life.

## MALNUTRITION

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### Description

Moderate acute malnutrition (MAM) and Severe acute malnutrition (SAM) are caused by a quantitative and/or qualitative imbalance between nutritional intake and individual needs. SAM may have the forms of Marasmus and of Kwashiorkor



### Concerned persons

Often the second youngest child affected: after being weaned there is not enough food rich in protein or the baby is reared on diluted contaminated milk (due to poverty of the parents not enough formula milk available, lack of cleanliness).



### Cause

- In developing countries the most common nutritional problems are caused by lack of protein and energy, fats, vitamins, minerals, iron and iodine (mostly due to lack of knowledge of the mothers, seldom due to lack of food, problems with absorption and metabolization).
- Underlying causes: poverty, inappropriate food, poor weaning practice; also infections such as diarrhoea, pulmonary tuberculosis, measles, malaria, worms or diseases like tuberculosis or HIV



### Symptoms

Marasmus:

- caused by low protein and low calories
- growth retardation <60% of normal
- loss of subcutaneous fat and muscles, severe wasting

- “old man’s face”, no oedema, no mental signs
- no hair changes
- serum albumin normal; age peak < 18mts

Kwashiorkor:

- caused by diet low in proteins but containing carbohydrates
- growth failure. Hepatomegaly.
- Muscle wasting
- “moon face”, pitting oedema, psychomotor changes, e.g. apathy
- sparse hair, depigmentation (often appears reddish)
- serum albumin low, age peak 18 – 36 mts

• **Note:**

- Oedema can conceal the fact that the child is undernourished and vitally threatened. There is a risk of overlooking malnutrition if only the weight of the child is measured.
- A child with oedema of both feet is malnourished (regardless of weight) until proven otherwise.
- Oedema must be recorded in the Road to Health Chart!
- On the contrary: a malnourished child may be mistaken to be dehydrated: there is a risk of fluid overload! To rehydrate a really dehydrated severely malnourished child use ReSoMal (reduced osmolarity rehydration solution) instead of ORS.

Criteria for assessing the nutritional status:

- Birth weight
- Weight-for-age
- Weight-for-height
- Mid-Upper Arm Circumference (MUAC)

Road to Health Chart:

- Standard for weight-over-age in percentiles:
  - Tool for monitoring growth development and for early detection of children at risk of malnutrition and severe illness
  - Body weight related to that of children of same age
  - 3 percentiles: 97th, 50th, 3rd percentile
  - Body weight in 3rd percentile: 3% of children of the same age weigh less, 97% weigh more
- Danger signs:
  - Children below the 3rd percentile

- Declining weight curve

Mid-Upper Arm Circumference:

- Correlating with weight of children below 5 years of age
- Rapid assessment tool for screening
- Checked on middle of hanging upper arm with tape measure
- Danger signs:
  - MUAC 11.5-12.5 cm: moderately undernourished
  - MUAC below 11.5 cm: severely malnourished

Important to remember:

- At every consultation children under the age of 5 years must be weighed and the results recorded in the Road to Health Chart.
- Any child with weight below the 3rd percentile is probably underweight.
- Declining weight curves are a sign that the child is at risk; weight falling below the 3rd percentile is cause for alarm.
- In undernourished patients the MUAC should be checked too: MUAC below 11.5 cm indicates severe malnutrition.



Differential Diagnosis

In case of oedema nephrotic syndrome should be ruled out (proteinuria)



Therapy:

- Appropriate diet:
  - Food advice
  - Monitoring of weight-for-height in feeding centers or hospital
- Admission of children with marasmus and kwashiorkor to feeding center or hospital for intensive therapy (therapeutic milk F75 initially, then F 100)
  - Admission criteria:
    - » Weight-for-height < 70% of median
    - » Bilateral lower limb oedema
    - » MUAC < 11.5 cm and presence of infection, seriously ill child
- post hospital treatment with RUTF (Ready to use therapeutic food) – f.e. “plumpy nut” - if available
- Treatment of concomitant infections
- Emotional support
- Advise for measles vaccination and for deworming around 8th day of treatment

Prevention in developing countries (WHO):

- Exclusive breastfeeding during the first 6 months of life
- Slow introduction of solids in addition to breast milk after 6 months
- Breastfeeding in addition to solids during the first 2 years of life
- Own plate for each child, not sharing with siblings or mother
- Support through health worker

## STROKE (CEREBRO-VASCULAR ACCIDENT)

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### Description

- Sudden onset of focal neurological deficit
- Mainly due to cerebral infarction (80%), less due to intracranial haemorrhages (20%)
- Note: the most common after-effect of (untreated) hypertension in Africa and Asia is – unlike in Europe – the stroke and not the myocardial infarction!
- TIA (transient ischaemic attack): loss of cerebral function for less than 24 hours
- PRIND (prolonged neurological deficit, minor stroke): symptoms longer than 24 hours, but less than 7 days

### Symptoms

- Clinically no difference between ischaemic and haemorrhagic stroke
- Contralateral hemiparesis, sensory loss
- Visual disturbance (diplopia, amaurosis fugax)
- Cranial nerve palsy (e.g. facial nerve palsy)
- Aphasia, dysarthria
- Confusion, loss of consciousness, coma
- Epileptic fits
- Irregular pulse with atrial fibrillation
- Carotid bruit with stenosis of carotid arteries
- Risk factors:
  - Hypertension
  - Coronary artery disease, atrial fibrillation
  - Diabetes mellitus
  - Smoking

### Differential Diagnosis

- Hypertensive crisis
- Migraine with aura

- Hypoglycaemia
- Cerebral tumor, abscess, meningitis, schistosomiasis, HIV
- Subdural haematoma after trauma

#### Therapy

- Ensure vital functions (e.g. pulse, breathing, blood pressure).
- If possible give oxygen via nasal prongs.
- Check for metabolic disorders, sepsis, pyrexia and treat if necessary.
- In rather desperate cases and when an embolic or ischaemic cause seems much more probable (f.e. with atrial fibrillation, CAD, carotoid brute) than a cerebral bleeding, give ASS 300mg/d (reduce to 75mg after 2 weeks) and consider i.v. fluids.
- Lower high blood pressure slowly (preferably with calcium antagonists):
  - First 3 days: tolerate BP up to 220/110 mmHg.
  - With very high BP (diastolic: 240, systolic 130 mmHg): lower by max. 20% of initial BP.
- Start iv in patients with swallowing difficulties and refer to hospital.
- Start rehabilitation program as soon as possible.
- Good nursing care is essential

#### **Note:**

In our projects there is only basic treatment possible; standardized investigations (e.g. CT-scan of brain) or treatment in stroke unit are usually not possible due to lack of availability and funds..

## DRUGS DURING PREGNANCY AND BREASTFEEDING

Classification of drugs in pregnancy and breastfeeding:

- + first line agent usually safe in pregnancy and breast-feeding; use only if non-drug treatment presumably not effective
- ± second line agent only indicated if other treatment is not effective; often insufficient information available about pregnancy and breastfeeding
- S single dose only single dose or low dose for 1-3 days
- (-) potentially toxic for embryo, fetus, newborn or breastfed infant; use only when potential benefit greater than the risk taken
- contra-indicated probably teratogenic or fetotoxic, possible adverse effects during breastfeeding or the benefit to the mother not outweighing the risk to the fetus

Drug	First trimester (1 <sup>st</sup> -12 <sup>th</sup> week)	Second/ third trimester (> 13 <sup>th</sup> week)	Short before term/ during labour	Breast- feeding
Acetylsalicylic acid	±, S	±, S	-	±, S
ACE-inhibitors	(-)	-	-	+
Acyclovir	+	+	+	+
Adrenaline	+	+	+	+
Albendazole	(-)	+	+	+
Aminophylline	+	+	+	+
Amlodipine	(-)	±	±	+
Amoxicillin	+	+	+	+
Antacids	+	+	+	+
Artemether + Lumefantrine	(-)	±	±	±
Atropine	+	+	-	-
Azithromycin	+	+	+	+
Beclomethasone (inhaler)	+	+	+	+
Benzyl benzoate (topical)	+	+	+	+ - on breast
Biperiden	+	+	+	+
Bisoprolol	+	+	(-)	+

Carbamazepine	(-)	±	±	+
Carbimazole	-	-	-	+
Cefuroxime	+	+	+	+
Chloramphenicol	(-)	(-)	(-)	-
Chloroquine	+	+	+	-
Ciprofloxacin	(-)	+	+	-
Clemastine	+	+	+	+, S
Clindamycin	+	+	+	-
Clarithromycin	+	+	+	-
Cloxacillin	+	+	+	+
Cotrimoxazole	(-)	-	-	-
Dexamethasone	+	+	+	+
Diazepam	+	+	+, S	+, S
Diclofenac	+	(-), S	(-), S	+
Diethylcarbamazine	-	-	-	(-)
Digoxin	+	+	+	+
Diphenhydramine	+	+	+	+
Doxycycline	±	-	-	-
Enalapril	(-)	-	-	+
Ethambutol	+	+	+	+
Ergometrine	-	-	- (postpartum possible with atonic uterus)	(-)
Erythromycin	+	+	+	+
Ethambutol	+	+	+	+
Ferrous sulphate	+	+	+	+
Folic acid	+	+	+	+
Furosemide	±	±	±	±
Gentamycin	-	-	-	+
Glibenclamide	±	±	±	(-)
Glyceryl trinitrate	+	+	+	+
Griseofulvin	(-)	(-)	(-)	-
H2-receptor antagonists	+	+	+	-
Hydrochlorothiazide	±	±	±	+
Hyoscine butylbromide	+, S	+, S	+, S	+, S
Ibuprofen	+	(-), S	(-), S	+

Insulin	+	+	+	+
Isoniazid	+	+	+	+
Isosorbide Mononitrate	+	+	+	+
Ivermectin	-	-	-	-
Ketamine	+	+	+	+
Ketoconazole	±	±	±	±
Lidocaine (local anaesthetic)	+	+	+	+
Mebendazole	(-)	+	+	+
Mefloquine	(-)	(-)	(-)	-
Metamizole	(-)	(-)	(-)	(-)
Metformin	+	±	±	+
Methyldopa	+	+	+	+
Metoclopramide	±	+	+	(-), S
Metoprolol	+	+	(-)	+
Metronidazole	+	+	+	(-), S
Multivitamins (vit. A < 6,000IU/d)	+	+	+	+
Nalbuphine	+	+	(-)	+
Niclosamide	+	+	+	+
Nifedipine	(-)	±	±	+
Nystatin	+	+	+	+
Omeprazole	±	+	+	+
Oxytocin	-	-	+	+
			(postpartum)	
Paracetamol	+	+	+	+
Penicillin V	+	+	+	+
Phenobarbital	(-)	(-)	(-)	+
Phenytoin	(-)	(-)	(-)	+
Povidone iodine (topical)	+	(-)	(-)	-
Praziquantel	±	+	+	+
Prednisolone	+	+	+	+
Primaquine	-	-	-	-
Promethazine	+	+	+	+
Pyrazinamide	+	+	+	+
Quinine	-	±	-	+
Ramipril	(-)	-	-	+
Ranitidine	+	+	+	-

Rifampicin	±	+	+	+
Salbutamol (inhaler)	+	+	+	+
Salbutamol p.o.	+	+	+, S	+
Silver sulfadiazine (topical)	+	+	(-)	(-)
Sodium valproate	(-)	(-)	(-)	+
Streptomycin	-	-	-	+
Terbutaline	+	+	+, S	+
Tetracycline (topical)	±	-	-	-
Tinidazole	(-)	±	±	(-)
Tramadol	(-)	+	+	+
Vit. A > 10 000 IU/d	-	-	-	+*
Vit. B	+	+	+	+
Vit. D	±	±	±	+

\* Vitamin A 200 000 IU can be given to mothers within 8 weeks of delivery (WHO recommendations)

## ABBREVIATIONS

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They should not be learned by heart! They are mentioned to give you an idea what you can find in a chart or a letter and to help you to understand.

AC .....	before meals
AB .....	antibiotics
Adm .....	admission
AF .....	atrial fibrillation
AFB .....	acid fast bacilli
am .....	in the morning
ARI .....	acute respiratory tract infection
ASA .....	acetylsalicylic acid
AXR .....	abdominal x-ray

BBB .....	bundle branch block
BE .....	barium enema
bid .....	twice daily (bis in die)
BM .....	bowel movement
b/o .....	because of
BP .....	blood pressure
BS .....	bowel sounds
BUN .....	blood urea nitrogen
Bx .....	biopsy

C .....	with
CA .....	carcinoma
CAD .....	coronary artery disease
Caps .....	capsule
CBC .....	complete blood count
CC .....	cough and cold
CCF/ CHF .....	congestive cardiac/heart failure
CHD .....	congenital heart disease
CI .....	contraindication
CNS .....	central nervous system
C/o .....	complaining of

COPD ..... chronic obstructive pulmonary disease  
 CRF ..... chronic renal failure  
 C&S ..... culture and sensitivity  
 CSF ..... cerebrospinal fluid  
 CVA ..... cerebrovascular accident  
 CXR ..... chest x-ray

D ..... day (d) or diarrhoea (D)

D&C ..... dilatation and curettage  
 D&V ..... diarrhoea and vomiting  
 DC ..... differential count  
 DCT ..... diagnostic counselling and testing  
 DF ..... dengue fever  
 DHF ..... dengue haemorrhagic fever  
 DM ..... diabetes mellitus  
 DOB ..... date of birth  
 DSS ..... dengue shock syndrome  
 Dx ..... diagnosis

EENT ..... eye, ear, nose and throat (department)

ENT ..... ear, nose and throat (department)  
 EPTB ..... extrapulmonary tuberculosis  
 EPH ..... oedema, proteinuria, hypertension  
 EOR ..... error of refraction  
 ESR ..... erythrocyte sedimentation rate  
 ETB ..... extrapulmonary tuberculosis

FB ..... foreign body

FBS ..... fasting blood sugar  
 F/U ..... follow-up  
 FU ..... fever of unknown origin  
 Fx ..... fracture

GIT ..... gastrointestinal tract

GUT ..... genito-urinary tract  
 H ..... hour

HAART ..... highly active antiretroviral therapy

Hb.....	haemoglobin
HBP.....	high blood pressure
Hct.....	haematocrit
Ht.....	height
Hx.....	history
I&D.....	incision and drainage
ICS.....	intercostal space
ID.....	intra dermal
IHCS.....	inhalative corticosteroids
IM.....	intramuscular
IO.....	lintraosseous
IUD.....	intrauterine device
IV.....	intravenous
IVP.....	intravenous pyelogram
KUB.....	kidney, ureter, bladder (x-ray)
LBM.....	loose bowel movement
LBP.....	lower back pain
LFT.....	liver function tests
LLE.....	left lower extremity
LLL.....	left lower lobe
LLQ.....	left lower quadrant
LMP.....	last menstrual period
LN.....	lymph node
LOC.....	loss of consciousness
LP.....	lumbar puncture
LUL.....	left upper lobe
LUQ.....	left upper quadrant
LVF.....	left ventricular failure
MUAC.....	mid-upper arm circumference
ND.....	not done
No.....	number
NPO.....	nil by mouth (nihil per os)
NS.....	normal saline

NSAID .....	non-steroidal anti-inflammatory drug
O&P .....	ova and parasites
OB-GYN .....	obstetrics and gynaecology
od .....	once daily
OE .....	otitis externa
OM .....	otitis media
OPD .....	outpatient department
ORS .....	oral rehydration solution
PCM .....	paracetamol
PEP .....	post-exposure prophylaxis
PID .....	pelvic inflammatory disease
pm .....	in the afternoon
PMB .....	postmenopausal bleeding
PMH .....	past medical history
PO .....	per os
PR .....	per rectum; pulse rate; parental route
prn .....	as required
PTA .....	prior to admission
PTB .....	pulmonary tuberculosis
PUD .....	peptic ulcer disease
PUO .....	pyrexia of unknown origin
PVD .....	peripheral vascular disease
qid .....	four times a day (quattuor in die)
RA .....	rheumatoid arthritis
RBC .....	red blood count
RBS .....	random blood sugar
RLE .....	right lower extremity
RLL .....	right lower lobe
RLQ .....	right lower quadrant
r/o .....	rule out
RR .....	respiratory rate
RUE .....	right upper extremity
RUL .....	right upper lobe

RUQ ..... right upper quadrant  
 Rx..... prescription

SC ..... subcutaneous

S/e ..... side effects

SL ..... sublingual

SMP ..... smear for malarial parasites

SOB ..... shortness of breath

Stat ..... straight away

STD ..... sexually transmitted disease

TCB ..... to come back

tid ..... three times a day (ter in die)

TLC ..... tender loving care

UGI ..... upper GI series

US ..... ultrasound

URTI ..... upper respiratory tract infection

UTI ..... urinary tract infection

V ..... vomiting

VCT ..... voluntary counselling and testing

V/E ..... vaginal examination

WBC ..... white cell count

Wt..... weight

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